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China Report

SCIENCE AND TECHNOLOGY

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CHINA REPORT

SCIENCE AND TECHNOLOGY

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NATIONAL DEVELOPMENTS

MA HONG ON COPING WITH GLOBAL TECHNOLOGICAL REVOLUTION

HK290655 Beijing LILUN YUEKAN in Chinese No 4, 25 Apr 85 pp 7-13

[Article by Ma Hong [7456 3163]: "The World's New Technological Revolution and Our Ways of Coping With It"--Editor's note: This is an excerpt of a speech which Comrade Ma Hong delivered in March 1985]

[Text] A hightide of the world's new technological revolution has appeared at present, which finds expression in the new technological areas emerging in economically developed countries, including information technology, biotechnology, new materials technologies, new energy technologies, oceanographic development technology, astronautics, and so on. In developed countries, these new technologies have been applied and developed to different degrees. We should see this objective reality and understand this information, and by no means should we be out of touch with reality. Comrade Zhao Ziyang called a special forum on 9 October, and delivered an important speech. He made the proposal that it is necessary to analyze and explore the development of new technologies, to formulate the best plan, and to propose correct ways of coping with the situation, so that when the time comes for the arrival of the new technological revolution in China, our measures may be appropriate and we may have the opportunity for a leap in development. Here, I should like to deal with the following two problems:

1. What Are the New Technologies and Industries Emerging in the World Today? And What Are Their Characteristics?

New and important results of the technological revolution have continued to appear since the 1940's. The United States built the first atomic reactor in 1942, which signaled the beginning of mankind's mastery of atomic energy. The first electronic computer appeared in 1946. It was capable of performing part of the functions of the human brain, and taking the place of some of the activities of the human brain. The development and manufacture of semiconductor transistors and integrated circuits were realized in 1947 and 1959 respectively, which basically changed the features of electronic components. The first man-made satellite was launched in 1957, thereby enabling human activities to enter into the realm of space. A new light source--the laser--first appeared in 1960, along with a new situation in its optical application. A qualitative leap took place

in modern technology between the 1940's and the 1960's. Microprocessors appeared in 1971 on the basis of the development of large-scale integrated circuits. Later, the comprehensive development of microelectronics technology, computer art, fiber-optic digital communication, and software technology has made possible the existence of a complete set of information technologies such as the production, reception, storage, processing, and transmitting of information, which have exerted wide influences on social production and all realms of human life. Biotechnology, new materials technologies, new energy technologies, and oceanographic engineering technology appeared one after another in the 1970's. Information technology has been the most conspicuous and active of these and has greatly affected the economic and social life of a country. Information technology chiefly includes microelectronic technology, computers, fiber-optic, communication, lasers, photoelectron technology, and so on. Next comes biotechnology, which includes genetic engineering, cell engineering, enzyme engineering, and fermentation engineering. Then, comes new materials; of which the most important ones are related to information, such as monocrystalline silicon, fiber optics, superconductor materials, and so on; and also structural materials for special usages and new-type functional materials. Regarding structural compound materials of high efficacy, there is carbon fiber, reinforced resin, high-quality engineering plastics, isolation membrane, new-type alloys, and so on; of which, reinforced resin material is 3 times stronger than our ordinary steel products. And thyre are new energy resources, including solar energy, bio-mass (such as methane), nuclear fusion, and so on. The research and development of solar energy has been carried out both in lighting and heating. The world's largest solar energy generating set with a capacity of 10,000 kw was built in the United States in 1982, and it has already transmitted output for commercial use. Five thousand kw Soviet solar energy generating set was built in 1983 and has been put to use. Both the United States and the Soviet Union are preparing to build 100,000 kw solar energy power stations. Now we come to oceanographic development technology. The land area on which mankind lives is very limited, while the sea--which makes up 71 percent of the surface of the Earth--is very extensive. The sea is a huge treasure house of all kinds of materials. It provides us with rich natural resources in food, minerals, and energy resources. For example, the sea contains 4 billion tons of uranium in its water, which is 4,000 times the deposits on land. The gold contained in sea water is 170 times the deposit on land. At present, the proportions of minerals provided to the world economy from the sea are: ziconium, 100 percent; titanium, 80 percent; magnesium, 60 percent; tin, 40 percent; and oil, 25 percent. In reference to oceanic biological resources, an annual catch of Antarctic prawns of between 50 million and 150 million tons will not affect the reproduction of that resource; while at present, the annual catch of fish is about 70 million tons, which has brought many species of fish to the verge of extinction. Therefore, the development of the Antarctic waters will provide mankind with a lasting supply of needed protein. At present, China's Antarctic investigation team has already founded the "Great Wall Station" in the Antarctic, which has begun China's scientific investigation of the Antarctic region. The gross output value of the world's oceanic economy was more than $13 billion in 1969; by 1980, it had grown to between $250 and $280 billion, increasing by 22 times in a short span of 2 decades. With the rising of the new technological revolution, military technology has also developed greatly.

If compared with the technological revolutions in history, what are the characteristics of the development of the new technologies and industries mentioned above? There are at least five characteristics: First, the current development of new technologies and industries is not the development of just a single technology and industry as it was in the past. For example, the textile machine came into being in the 18th century, later the steam engine appeared, then came electricity, and finally nuclear energy. True, these technologies appearing in succession had brought along the progress of other technologies and industries; however, they each appeared as a single new technology. It is not the same with the current new technological revolution. New technologies have emerged in groups, and in the form of a group, with many new technologies and industries appearing simultaneously. Therefore, they are now called new technology and industry groups. Second, of the new technology and industry groups, some still play the principal role, such as information technology and industry, including electronic technology, computers, microelectronics, fiber-optic communication, lasers, and the whole information system. Along with the emergence of technologies and industries related to information technology are new technology and industry groups, but information technology and industry plays the leading role. Third, an important characteristic of these new technology and industry groups is their appearance in the form of intensive knowledge and technology. Take, for example, the area of concentrated high technology industries in California, USA--"silicon valley"--which used to be an orchard; now the output of semiconductors in this area accounts for one-fifth of the gross output of the whole world. This area has concentrated a large number of qualified people specialized in science and technology. Of course, technology intensive and knowledge intensive also means capital intensive; and investment has been rather concentrated. Fourth, these new technologies and industries develop very quickly, quicker than any other technological revolution in history. It took several decades and more for the emergence of any important new technology in the past; but now new technologies have appeared in quick succession, with the period in between being greatly shortened. For example, the interval between the appearance of the first atomic reactor in 1943 and of the computer was 4 years. Semiconductors first appeared in 1946, the man-made satellite was launched in 1957, integrated circuits appeared in 1959, the new light source--laser--came into being in 1960, and the recombination of genes became a reality in 1973. Electronic computers have developed to the fifth generation since coming into existence. The speed of computers has increased by 10 times, and, in every 6 years, its memory has increased by 20 times and its price dropped by 40 times. Compare the first computer with the ones today, and we will find that the volume now has reduced to one thirty-thousandth, and the cost dropped to one ten-thousandth. A given variety of computer is developing with each passing day, not to mention the increase of new varieties. And fifth, the appearance of new technologies and industries has brought about some changes in the production mix and social structure. Take the United States for example, the most marked change is to classify the production mix into the so-called "sunset industries" and "sunrise industries." The former refers to iron and steel, shipbuilding, and textile industries, which are traditional industries, and have been undergoing a slump in recent years. That is why they are called "sunset industries." And the latter refers to those new industries mentioned above; which are like the sun at 8 or 9 o'clock in the morning, and are flourishing more and more. The "sunrise

industries" are thriving, while the "sunset industries" are declining. Then, there are changes in the social structure as well. The number of technology intensive industries is growing, together with the industries serving them; and eventually, there will be corresponding changes in the social structure. Take the United States for example again, they have their specific classifications, namely, primary, secondary, and tertiary industries; and now they have added the so-called "fourth" industry. Primary industry refers to agricultural production and the production of industrial raw materials. Secondary industry refers to the production of the processing industry. Tertiary industry refers to those industries included in neither primary nor secondary industry and covers a very large scope which includes government officials and policemen and so on, along with what we call the service trades. The so-called "fourth industry" is now also referred to as the information industry. Of the entire working population in 1880, that is a century ago, people employed in primary industry accounted for 50 percent, secondary industry 36 percent, and tertiary industry, 14 percent. And tertiary industry covered a much smaller scope at that time. In 1956, primary industry accounted for 14 percent, secondary industry 37 percent, and the tertiary industry 49 percent. At that time, information industry alone accounted for 29 percent of tertiary industry. In 1976, primary industry accounted for 4 percent, the majority of which was agriculture; secondary industry 29 percent; and tertiary industry 67 percent; of which, information industry accounted for 50 percent. We can also see the changes in the U.S. agricultural population, which accounted for 90 percent of the entire labor force in 1970, but dropped to 4 percent in 1973 and 2.6 percent in 1982. This refers to those directly engaged in farming, and excludes those industries serving agriculture before and after production, such as seed, fodder, fertilizer, and processing. The changes in the production mix and social structure are obvious, and a new phenomenon. They have, in turn, brought about the changes in the distribution of labor forces in different areas. The developed northern and eastern parts of the United States are now declining; while the western and southern parts are thriving. And there are changes in the scope of enterprises as well. At present, small and medium-type enterprises have emerged in great number, which is greatly related to the rise of new technologies. This is because "it is easier to turn a smaller boat around." The changes mentioned above find most conspicuous expression in the United States, however such tendencies can be found in other developed countries as well.

Regarding the above mentioned situation, if we fail to pay attention to it, study it, and adopt correct measures to quickly catch up, we will always lag behind in science and technology. Regarding this, Comrade Hu Yaobang made a very important statement on 18 November 1983, he said: Among our comrades, more and more people are pursuing new, modernized science, and technology in earnest, and are studying ways of linking new knowledge with the question of how to change the present condition of China. This is good news worthy of congratulations. However, we must seriously note that there are still a greater number of leading members, primarily leading cadres engaged in economic work, who have basically shown little interest in knowledge of new and modernized science. Some of them regard themselves as professional, and do not care a bit for new things in the world. Others have gone so far as to regard the new results created by our contemporaries as heresy and some sort of bourgeois sugar-coated bullets. Is this not really the case? If so, should the chief task for educating cadres in the economic field be the struggle against ignorance or the fight against the so-called "liberalization?"

True, "bourgeois liberalization" does exist in politics and ideology, and it should be well guarded against and overcome; but with regard to the economic field, concrete analysis should be appropriately made. This is a question for all of us to solemnly think over. These remarks are very important. It is imperative for us to follow the advices of Comrades Hu Yaobang and Zhao Ziyang, and to attach great importance to the world's new technological revolution. We should at all times ask about, find out about, keep track of, and study this question, so as to propose our correct ways of coping with it.

2. How Should We Meet the New Technological Revolution?

With regard to this question, we should recall what Comrade Deng Xiaoping said at the opening ceremony of the national conference on science 6 years ago. He said: "Modern science and technology are now undergoing a great revolution. The advances over the last 3 decades have not been limited to particular scientific theories or production techniques, nor have they just represented progress and reform in the usual sense. Rather, profound changes have taken place and new leaps have been made in almost all areas. A whole range of new sciences and technologies are continuously emerging. Modern science opens the way for the improvement of production techniques and determines the direction of their development. Many new instruments of production and technical processes first come into being in the laboratory. A series of new industries, including high-polymer synthesis, atomic energy, computers, semi-conductors, astronautics, and lasers, have been founded on the basis of newly emerging sciences. Of course both now and in the future there will be many topics of theoretical research for which at the moment no practical application can be seen. But a host of historical facts have proved that once a major breakthrough is achieved in theoretical research, it leads, sooner or later, to enormous progress in production and technology. Contemporary natural science is being applied to production on an unprecedented scale and with unprecedented speed. This has given all fields of material production an entirely new look. In particular, the development of computers, cybernetics, and automation technology is rapidly raising the degree of automation in production. With the same manpower and the same number of man-hours, people can turn out scores or hundreds of times more products than before. What has brought about the tremendous advances in the productive forces and the vast increase in labor productivity? Mainly the power of science, the power of technology." ("Selected Works of Deng Xiaoping" p 84).

Looking back today, we have a better understanding of how correct Comrade Deng Xiaoping's words are. Now, 6 years have gone by since 1978, and there are only 15 years left before the year 2000. According to the forecasts of many departments, the technological revolution, which has continued for more than 20 years in the postwar period, will make further great progress in the not too distant future. During this process, industrially developed countries may make further progress in technology, while some developing countries may make rather quick progress as well. We often say that we must acquire a sense of pressure. With regard to science and technology, such a sense of pressure has never been so keenly felt as it is now. We can be sure that by the end of the 20th century, there will still be antagonism between the socialist and capitalist

systems on the Earth. Therefore, this is not simply an economic challenge, but also a political challenge. It is not only an important struggle in the economic field, but also a fierce competition between the two social systems. Every one of our revolutionaries, communists, and Marxists should have a sober understanding of this. We should take action promptly and meet this challenge. How then should we meet this new technological revolution?

Confronted with the development of the world's new technological revolution, people may have three different attitudes.

One attitude is being indifferent to the whole thing, regarding the world's new technological revolution as something still remote; therefore, no attention is paid to it at all. This is certainly a wrong attitude.

Another attitude is being overanxious for quick results, holding that it is possible for us to complete this technological revolution quickly; hence the blind attempt to catch up with advanced countries in an all-round way. We had the same experience before, namely, the wishful thinking of catching up with and surpassing advanced countries economically and technologically in an all-round way within a very short period of time. This is unrealistic.

The third is the truth-seeking attitude, which the Central Committee has consistently advocated since the 3d Plenary Session of the 11th Central Committee. We should meet the current global new technological revolution with enthusiasm based on China's national conditions and our needs and possibilities. In matters where the research and development of new-rising technologies and the building of new-rising industries are concerned, it is necessary to adopt the principle of fixing limited targets, making the focal points stand out, and doing our best to make use of new-rising technologies, in order to promote China's socialist modernization. We went in for copying others in the past. It was wrong to copy Soviet experiences indiscriminately. And it will be equally wrong to copy Western experiences indiscriminately. We should not adopt such a measure. Neither should be follow in the footsteps of Singapore and South Korea, which have gone in for those new industries which specialize in processing for export. We should not do so because we are basically different from them. In short, we should neither adopt the strategy of "copying others' experiences indiscriminately," nor should we adopt the strategy of "catching up with and surpassing developed countries," and by no means should we adopt a strategy of "self-closure." We must adopt a new strategy for development which is suitable to China's national conditions. We must think of our own ways of coping with it, starting from China's national conditions, with the realization of the strategic goal proposed by the party's 12th National Congress being our purpose. Such ways of coping with the world's new technological revolution should be most capable of promoting the construction of the key projects, which are indispensible to realizing the strategic targets. They should be capable of bringing the greatest vitality to the technological progress of the 400,000 existing enterprises and more than 1 million enterprises in towns and townships. They should be capable of ensuring new breakthroughs in economizing on raw materials and funds, improving economic results, and increasing the accumulation of capital. They should be most capable of pushing forward the acceleration in training qualified people and improving management. And they should be capable

of bringing into fullest play the role of strengthening our national power and improving the people's living standards. In short, we must conduct meticulous investigation and research in all respects and make analysis and comparison before we determine our ways of coping with the world's new technological revolution.

Our general target is to quadruple the gross industrial and agricultural annual output value by the end of the year 2000, on the basis of improving economic results, and to make the people's living standards reach a comparatively well-off level. How can we better achieve this aim?

We should primarily study China's national conditions in earnest. What are China's basic national conditions? First, it has a large population, a population of 1 billion. Second, it has a weak foundation. And third, it is characterized by the imbalance in economic development. Therefore, in order to meet the world's new technological revolution, we should take into consideration China's national conditions, and we must make them our starting point. In this respect, we need to think out in earnest the following questions:

First, China has already built a considerably large-scale industrial base, and some industries have comparatively great production capacity. However, the infrastructure needed by modern society is still extremely weak; the levels of technology and management of traditional industries are comparatively low; manual work still accounts for an extremely great proportion in agriculture, while the labor force in agriculture still takes up the major part of the entire work force of the whole country; and the development of different regions is extremely unbalanced. We should say that China's tasks for industrialization have not been completed yet.

Second, China's gross industrial and agricultural output value is still comparatively low, and the gap between China and major economically developed countries is still wide in the absolute sum of investment in economic construction, scientific research, and education.

Third, China has acquired a certain basis in the research and development of new technologies and made important achievements in their application to national defense. However, it has not yet shaped into new-rising industries with competitive economic power and it has not been fully applied to economic construction.

Fourth, China has achieved market results in the readjustment and reform of economic policies, structure, and management. However, the advantages of the socialist system are far from being brought into the fullest play, and there are still some links in production relations and the superstructure which have seriously fettered the development of the productive forces.

Fifth, China's science and education undertakings have greatly developed, and China now has a science and technology contingent with a considerable number of specialized people attaining certain levels. However, the proportion of investment in science and education is far too low, and the role of the intellectuals

have not been brought into full play, the aging problem of the science and technology contingent and the condition of the aging of knowledge are rather grave, the level of science and culture of the masses is comparatively low, and the majority of cadres lack knowledge in modern science and technology and management.

And sixth, China has implemented the policy of opening up to the outside world, which has created good conditions for technology imports and the utilization of foreign capital. However, because new-rising technologies are connected with the intense competition in military affairs and economics, we are bound to meet with obstacles in world trade and technological transfer.

Therefore, the new technological revolution is a severe challenge to the managerial system and operational ideas which are not suitable to the development of our productive forces, to our weak economic power and labor productivity which lack competitive power in the world and to our comparatively low level of culture, education, science and technology.

At the same time, the new technological revolution has also given us a chance to skip some stages of technological development with some choice, and to adopt some new technological results in saving energy, raw materials, and funds while acquiring greater economic results, and to develop technological transfer and economic trade by making use of the readjustment of the economic structure of developed countries and the intense competition between various countries. And there is also the possibility for us to refer to modern methods and experiences in management and operation of development countries, and to adopt new technological means in order to accelerate the reform of management and to raise efficiency. The application of such new technologies as television communications satellites, computers, and microprocessors will step up the spread of science and the exploitation of intellectual resources under the condition of insufficient teachers and limited funds. If the television coverage is very wide, the spread of knowledge can be faster still; and we can ask the best teachers to give lectures. It will be very difficult for a country like ours, which has a population of 1 billion, to raise the level of education by solely relying on running schools. However, if modern methods are adopted, the weakness in this aspect may be overcome to a certain degree.

In the 1950's, we lost no time in paying attention to developing advanced technology in order to promote the modernization of national defense. That was a successful strategic decision. Now we must grasp the opportunity to meet the challenge. We must adopt active ways of coping with the situation starting from the strategic height of accelerating technological progress and striving to gradually narrow the technological and economic gap between us and developed countries. This has become a matter which demands immediate attention.

What then are we going to do?

One of the questions involved is related to the understanding of the basic concept of ways of coping with the situation and striving to achieve the target. And the basic concept is how we can more efficiently accomplish the strategic target proposed by the party's 12th National Congress, and how we can better serve the realization of the strategic purpose.

Regarding the technological level, what kind of a target will we achieve by the year 2000? This has already been determined by the Central Committee. Generally speaking, by the year 2000, we should attain the level the developed countries had reached by the 1970's and early 1980's. This refers to the whole society. However, in reference to some departments, industries, and products, we should attain the world's advanced level of the year 2000. It is likely that some of them will fail to attain the levels of the 1970's and 1980's. However, there will be things to be created all by ourselves, which may not exist in the rest of the world at that time. Some comrades hold that this target is not exciting enough and is too backward. Others say, this target is actually "catching up with and surpassing others by trailing after them at a snail's pace." This is not true. In his talks with foreign guests, Comrade Deng Xiaoping said, if such a target is accomplished by that time, it will be something quite extraordinary. Therefore, on this point, there needs be a unified understanding.

The second point is the relationship between new-rising industries and traditional industries. Some comrades hold that we should follow the example of developed Western countries, focus our attention on the development of new-rising industries, and put the technical transformation of traditional industries in a secondary place. Another view holds that we should focus our attention on the technical transformation and technical progress of traditional industries, and arm our traditional industries with up-dated technologies for their progress; and with this as a starting point, we will develop whatever new technologies and industries which are needed in serving the purpose. Through discussion, it is held that the latter method is better. As mentioned before, China is still not an industrialized country; although we have our traditional industries and a comparatively complete industrial system, but still, our traditional industries are not modern. If we transform our traditional industries by using very successful modern technologies, the development of our new technologies will have a better foundation. At the same time, it will provide a larger market with greater demand for the development of new technologies. Therefore, Comrade Zhao Ziyang said, we cannot develop new technologies just for their own sake, and the proposal of the West on "sunrise industries" and "sunset industries" does not apply to us. We cannot adopt the method of making the so-called "sunset industries" decline, and make the so-called "sunrise industries" thrive. We should make good use of precisely such an opportunity, namely, when developed Western countries neglect things in some respect, we must do a good job exactly in that respect. This will not only meet the ever-expanding needs of the domestic market, but will help us acquire a place in the world market. The Western countries are all vying for the development of new-rising industries, and they are not so interested in those traditional things such as iron and steel, and shipbuilding industries. If we grasp this change and go in for things in this category, the Western technologies in those fields will still be useful to us. And if we make use of their technologies, or buy their equipment to develop, build, and transform our own traditional industries, this may not only promote our own development, but also enable us to have certain competitive power in the world market. Therefore, we should not set new-rising industries against traditional industries. This is the second question to be solved in our understanding.

And lastly, there are some problems concerning reform and relevant policies. This is because the present challenge is not only one to our science and technology sector, but most likely a far more severe challenge to our managerial system and operational ability; for new-rising technologies and new-rising industries represent new productive forces. New rising industries differ from traditional industries. The former have the following few characteristics: First, changes in technology are fast; second, the renovation of equipment is rapid; third, the requirements for quality are high; fourth, market competition is intense; and fifth, investment risk is great. Our existing managerial system, decisionmaking procedure, and managerial methods are not suitable to all this. It is necessary to import new-rising technologies, and it is imperative to implement a policy of further opening up to the outside world. We are running special economic zones [SEZ's], and special policies must be adopted in the SEZs. If we want to develop new technologies and industries, we must adopt particular policies and measures to encourage and attract foreign business to invest in new-rising technologies and industries.

With regard to a small number of production and scientific research units which possess conditions, we should allow them to organize themselves into economic entities which combine scientific research and trial production, in order to make some breakthroughs in the development of new technologies as quickly as possible. Such an entity may be organized with the factory or the scientific research unit as the main component; and an economic entity may also be organized with the research institute of a university as the main component. Such an economic entity may go under contract to the state, namely, under the principle of holding itself responsible to the state, it will be given special financial aid and a high level of decisionmaking power by the state, being free of the restriction of the existing managerial system. This high decisionmaking power includes the right to make connections with foreign countries, in order to be helpful in making use of all channels and methods to lose no time in importing and mastering advanced technologies.

Cities with comparatively high concentrations of technical personnel may run small new technological development districts on a trial basis. This can be done either in coastal cities or inland cities possessing these conditions. Of course, it is impossible to go in for all the new technologies within a region. It will be good enough if a breakthrough is made in some field.

We must start from the actual conditions of China in developing new-rising technologies and in applying the results of the new-rising technological revolution. Priority must be given to those key points with regard to our manpower, materials, and money resources, and attention should be attached to economic results. China abounds in small enterprises, and the task for technical transformation is heavy. The technical transformation of many small enterprises does not involve the extension of their factory buildings, they need only be equipped with microelectronic computers and other necessary equipment to improve the quality of products, to increase their output, to accomplish marked economic results, and to change the backward features of the enterprises. This is a

shortcut to accelerating the technical transformation of traditional enterprises, to push forward their technical renovation, and to gradually shift China's industry onto a new technical basis.

In the face of the world's new technological revolution, we have an advanced socialist system, a staunch and powerful party leadership, a hard-working and wise people, and extremely favorable conditions in many respects. Beyond doubt, so long as our ways of coping with the situation are correct, and so long as we rouse ourselves to work hard, we will certainly make our economy, science and technology make rapid progress, and will victoriously realize the strategic target formulated by the party's 12th National Congress.

CSO: 4008/354

NATIONAL DEVELOPMENTS

NATIONAL TECHNICAL TRADE FAIR OPENS IN BEIJING

OW150436 Beijing XINHUA in English 0202 GMT 15 May 85

[Text] Beijing, 15 May (XINHUA)--Chinese colleges have brought about 1,500 technical results, services and new products to the first national technical trade fair which opened here today.

Zhang Peirong, deputy head of the Science and Technology Department under the Ministry of Education, said that many colleges have sent delegations headed by their presidents to the fair.

Zhang noted that such an activity would promote scientific research as well as enhance academic work, and thereby train the students both in theory and practice.

The 31 key colleges affiliated to various ministries have offered enterprises 1,921 applicable research results since the beginning of this year, Zhang said.

Colleges have bagged 221 national awards for invention. This is almost one-fourth of the total. About 600 applications for patents on invention, 40 percent of the national total, were filed by colleges.

According to a survey made in May 1984, these 31 ministry colleges signed 8,000 short or long-term research contracts with enterprises. More than 1,000 teachers and researchers have been invited to be advisors of enterprises.

They have already trained 120,000 technicians and skilled workers for enterprises and other institutions.

Zhang said that among research results adopted in recent years, 153 each have won the nation over 1 million yuan annually, making the total benefit to 810 million yuan each year. [as received]

China has 390,000 teachers and researchers in about 900 colleges and universities. Most of them have set up technical development centers to help enterprises apply research results, Zhang disclosed. He added that colleges are providing services not only to big cities but also to small towns, frontier areas and even rural enterprise, where technical help is badly needed.

CSO: 4010/151

TRANSACTIONS BRISK AT TECHNICAL TRADE FAIR

OW270116 Beijing XINHUA Domestic Service in Chinese 1153 GMT 23 May 85

[Excerpts] Beijing, 23 May (XINHUA)--In the 9 days since the First National Technical Products Trade Fair opened, transactions were so brisk that the number of customers reached over 120,000, over 1,000 contracts on technical transfers were signed, and technical transfer contracts and sales of new products amounted to 210 million yuan.

As technical products were in great demand, the various participating trade delegations had to put "reserve products" on display in their booths, keeping the fair even more brisk. The number of technical products put on sale far exceeded 15,000, the number announced by the fair officials at the beginning.

At the individuals' technical products trade section, the number of technical products put on sale doubled the original number of 100. Some 40 technical transfer contracts were signed, worth 280,000 yuan. A scientific researcher from Jilin made over 60,000 yuan from transactions. Many of the newly added technical products were accompanied with detailed instructions and exquisite small replicas which proved to be very appealing.

CSO: 4008/354

NATIONAL DEVELOPMENTS

HEBEI SCIENTIFIC, TECHNOLOGICAL WORK CONFERENCE ENDS

SK280427 Shijiazhuang Hebei Provincial Service in Mandarin 2300 GMT 15 May 85

[Text] The provincial scientific and technological work conference successfully concluded on the afternoon of 15 May. During the conference, participating delegates conscientiously studied the CPC Central Committee's decision on the reform of the scientific and technological system, heard and discussed Governor Zhang Shuguang's report, discussed our province's provisional regulations and regulations for trial use on reform of science and technology, and summed up and exchanged experiences in reform. In a democratic atmosphere, they aired their views freely, and put forward many good opinions and suggestions.

Leading comrades of the provincial CPC committee held several forums to earnestly hear the opinions of the delegates, in particular the scientific and technical personnel from the forefront of scientific research.

At the end of the conference, Comrade Xing Chongzhi, secretary of the provincial CPC committee, spoke on matters concerning the people most.

On how to treat the achievements and problems in the reform of the scientific and technological front conducted last year, Comrade Xing Chongzhi said: Last year, the situation on the whole scientific and technological front of the province was good. This was the mainstream. On the other hand, certain problems also arose due to lack of experiences, and some areas needed to be improved. In some units, unhealthy trends emerged. Now when we are making inspection by the standard of the CPC Central Committee's decision on reform of the scientific and technological system, we should uphold whatever is right, improve whatever is imperfect, and resolutely correct everything that belongs to unhealthy trends. We should not weaken our determination to carry out reform and negate its orientation and achievements whenever we see some flaws or whenever unhealthy trends emerge. Anyone who does so will commit mistakes.

On the question of whether leading persons at various levels can regard science and technology as productive forces, Xing Chongzhi said: Correcting our understanding of the issue that science and technology are productive forces is a key to successful scientific and technical work and reform of scientific and technological system. Leading comrades at various levels should study anew Marxist theses on science and technology and the CPC Central Committee's instruction, further eliminate the leftist influence, make more contacts with scientific and technical personnel, and study more scientific and technological knowledge.

Xing Chongzhi also pointed out: The intellectual contingent of our province is a very good one. Under difficult working and living conditions, many of them still exert all of their enthusiasm into the four modernizations with pure patriotism, a high sense of responsibility and a devotion to their work. They deserve to be respected. Party and government leaders at various levels should truly consider, with actual deeds, intellectuals as valuable wealth of the party and the state, and a part of the working class, especially a part that is knowledgeable. They should not give empty talk but should do real things for the benefit of intellectuals.

Xing Chongzhi stressed: We should mobilize the whole party to attach importance to the reform of science and technology, and implement the CPC Central Committee's decision.

He said: Restructuring of science and technology is never a task for scientific and technological departments alone. It is a common task for the scientific and technological, educational, and economic fields, as well as other relevant departments. This calls for the attention of the whole party, and the concerted acts of the various circles of society. We should do a good job in propaganda, unify our thinking, make concerted efforts, and work in close coordination.

He also urged CPC committees and governments at various levels to successfully lead the reform, and urged departments in charge of scientific and technological work to study new situations continuously, sum up new experiences, and discover and support the masses' new creation.

Attending the closing ceremony of the conference were leading comrades of the provincial CPC committee, People's Congress Standing Committee, government and CPPCC committee, including Zhang Shuguang, Xing Chongzhi, Xie Feng, Li Feng, Ye Liansong, Yang Zejiang, Bai Shi, Xu Chunxing, Wang Yu, Du Jingyi and Ma Zhuozhou. Comrade Xie Feng presided over the closing ceremony.

CSO: 4008/354

GUANGXI SCIENTIFIC, TECHNOLOGICAL WORK CONFERENCE ENDS

HK220148 Nanning Guangxi Regional Service in Mandarin 1130 GMT 20 May 85

[Excerpts] The regional conference on scientific and technological work, which lasted 6 days, concluded in Nanning on 19 May. Responsible comrades of the region, including Wei Chunshu, Huang Yun, Jin Baosheng, (Tao Aiying), Huang Rong, and (Li Zhentian), attended the closing ceremony, which was presided over by Comrade (Huang Rongzhen). [passage omitted]

At the closing ceremony, Comrade Huang Yun expounded on the important and profound significance of reform of the system of science and technology and put forward views on reform of the system of science and technology in our region. Comrade Huang Yun said: We must completely implement the decision of the central authorities on reform of the system of science and technology. In conjunction with the realities of our region, we must extensively implement the contract system for technology and must do well in reforming the system of science and technology in our region.

He said that in doing so, there are six advantages:

1. Practice over the past few years has proved that reform of the system of science and technology is an effective method and is apt to be accepted by people.

2, It can arouse people's enthusiasm and can turn a large number of technological achievements into commodities.

3. It is beneficial to the task of linking technology with the economy. Scientific and technological units and workers can sign contracts with large enterprises for providing technological advice on and assistance in a single item and with medium-sized and small enterprises and specialized households for providing technological advice on and assistance in all items. [passage omitted]

4. It is advantageous in breaking through the shackles of conventions and is more flexible.

5. It is beneficial to the rational flow of qualified personnel and to absorbing qualified personnel by distant mountainous areas.

6. It can solve the problems of funds for scientific research more quickly. The income of all scientific research units from contracts for providing technological advice and assistance will be several times greater than the funds appropriated by their upper levels.

He expressed the hope that the participants will sum up new experiences in contracting for providing technological advice and assistance so as to make their work constantly perfect. He hoped that they will attach importance to scientific management, get rid of the influence of leftist ideology and egalitarianism, and overcome some people's jealousy of the increased income of technological personnel after contracting for providing technological advice and assistance.

In conclusion, Comrade Huang Yun spoke about the problems of strengthening leadership and of strengthening the building of ranks of science and technology. He hoped that leaders at all levels will include scientific and technological work on their agenda, formulate plans for implementation, respect knowledge and qualified personnel, and support scientific and technological personnel to gear their work to the needs of the economy and to serve the economy. [passage omitted]

CSO: 4008/349

NATIONAL DEVELOPMENTS

YUNNAN MEETING DISCUSSES SCIENCE, TECHNOLOGY WORK

HK280425 Kunming Yunnan Provincial Service in Mandarin 1100 GMT 27 May 85

[Excerpts] The provincial government held yesterday in Kunming a provincial meeting on science and technology work. The meeting conveyed and acted in the spirit of the national conference on science and technology work and the resolution of the CPC Central Committee on reform of the science and technology structure. Also, the meeting discussed and worked out the specific policies and measures. It was attended by more than 500 people. In addition, this is the largest meeting that the province's science and technology circles have ever held.

The province's scientific and technological achievements have played an important role in promoting the province's economic construction. However, the province's current science and technology structures will have some serious defects. This has adversely affected the initiative of scientific and technological personnel, as well as the development of science and technology. It also does not conform to the in-depth development of reform of the economic structure, and the arduous task of economic construction.

Proceeding from the province's actual conditions, the meeting will discuss and formulate the interim provisions for supervising the pace of reforms, the suggestions on actively developing the province's scientific and technological markets, the interim provisions for strengthening the technology of enterprises and its capability of supporting the border area, the interim provisions for reforming and expanding the decisionmaking power of privately run units, the interim provisions for contracting out the key scientific and technological projects on trial basis, and so on. The meeting has implemented in a down-to-earth manner the resolution of the CPC Central Committee on reform of the science and technology structure.

The opening ceremony of the meeting was presided by Vice Governor He Zhiqiang. Vice Governor Li Zhengyou delivered the opening speech.

CSO: 4008/354

SHANGHAI GETTING MORE TECHNOLOGY FROM HONG KONG

OW100902 Beijing XINHUA in English 0747 GMT 10 May 85

[Text] Shanghai, 10 May (XINHUA)--Shanghai has bought 31.8 million U.S. dollars-worth of technology from Hong Kong since it was granted the authority to undertake direct technological imports.

This includes imports worth 14 million U.S. dollars in the first quarter of this year, according to the municipal commission of foreign economic relations and trade.

Negotiations on the import of 20 more items of advanced technology are under way with Hong Kong firms, the commission said.

The city now has trade relations with nearly 3,000 Hong Kong firms.

Of the city's 91 joint ventures and cooperative businesses, 56 were set up in cooperation with Hong Kong firms; investment from Hong Kong in these enterprises exceeds 320 million U.S. dollars--one-third of the total foreign investment in Shanghai since 1979.

Hong Kong investments are concentrated in tourist hotels and apartment buildings. Other fields of cooperation involve production of textiles, foodstuffs, toys and building materials.

The total volume of trade between Shanghai and Hong Kong amounted to 180 million U.S. dollars in the first 3 months of this year, slightly less than in the same 1984 period.

Shanghai is to hold its first industrial product exhibition in Hong Kong in September.

CSO: 4010/151

SCIENTIFIC, TECHNOLOGICAL WORK SESSION ENDS

SK210205 Shenyang Liaoning Provincial Service in Mandarin 2200 GMT 20 May 85

[Text] After a 6-day session, the provincial scientific and technological work conference ended in Shenyang on 20 May.

During the session, comrades participating in the conference conscientiously studied and grasped the decision on the reform of scientific and technological system by the CPC Central Committee and widely and thoroughly discussed the ways to implement the central authority's decision and achieve the reform of the scientific and technological system in our province in line with our province's actual conditions.

At the conference, awards were given to 229 individuals and units, that won Liaoning Province's great prizes for scientific and technological achievements in 1983.

Issuing certificates of award to prize winners were leading comrades, including Dai Suli, Quan Shuren, Wang Guangzhong, Li Guixian, Li Tao, Zhang Zhengde, and Song Li. Governor Quan Shuren delivered a summing-up speech at the conference.

After summing up the overall achievements scored by the provincial scientific and technological front over the past 1 year, Quan Shuren pointed out: Along with the deep development of the reform of the economic structure, the task facing the scientific and technological front gets heavier and heavier. However, our current economic structure cannot catch up with the demands of the situation. The chronic situation of science and technology being separated from the economy failed to be basically improved. Along with the issue of the decision on the reform of the scientific and technological system by the central authority, our province has entered a new phase of development in scientific and technological undertakings. We must seize the right time and strive to set up a new scientific and technological system within a few years.

At present, we should take hold of opening technological markets and changing the appropriation system to promote the reforms in other fields. Through reforms, the productive forces with the greatest potentials will be liberated and some scientific and technological personnel will be able to give full play to their creativeness so that the scientific and technological achievements will rapidly become suitable for production.

Quan Shuren called on party committees and governments at all levels to really foster a strategic idea of relying on science and technology to enliven the economy, to strengthen the leadership over scientific research units, and to conduct full cooperation among planning, economic, and educational departments so as to promote a smooth progress of the reforms of the scientific and technological system and the economic structure at the same place.

CSO: 4008/349

HUBEI SCIENCE, TECHNOLOGY WORK CONFERENCE ENDS

HK141430 Wuhan Hubei Provincial Service in Mandarin 1100 GMT 13 May 85

[Excerpts] Wang Guoquni, a reporter of this station learned at the provincial science and technology work conference which concluded today, that beginning in July last year, 40 of the 85 scientific research units which have engaged in development work, have carried out reforms so that they have paid back the scientific research funds which they spent. According to the statistics of 20 units, including the (Jiaodanshizi) Research Institute in Xiangfan City, which have carried out reforms, after 17 scientific research institutes reformed the system of appropriating funds, they made more achievements and a lively situation has emerged. The amount of scientific research work completed last year was double that in 1983. Among them, nine scientific research institutes have succeeded in spending no state funds at all. The income of the other 11 units last year was more than the funds the state appropriated for them and they are basically economically independent. [passage omitted]

At the conference today, in his summing up, Tian Ying, member of the Provincial CPC Committee Standing Committee and vice governor, emphasized that in reforming the system of science and technology, it is necessary to grasp four key points: opening up a technological market, reforming the system of appropriating funds, strengthening the enterprises' ability to absorb technology and to develop, and training a large number of middle-aged and young backbone scientific and technological elements. Comrade Tian Ying demanded that all places, departments, and units seriously implement the decision of the CPC Central Committee on reform of the system of science and technology and the views of the Provincial CPC Committee and the provincial government to be sent down soon on implementing the decision of the central authorities on reforming the system of science and technology. They must contribute toward the development of science and technology in our province and toward the invigorating of the Hubei's economy.

CSO: 4008/349

SHANXI TO REFORM SCIENCE, TECHNOLOGY SYSTEM

HK200148 Taiyuan SHANXI RIBAO in Chinese 3 May 85 p 1

[Report by Xing Changming [6717 7022 2494]: "Major Reforms To Take Place in Shanxi's Science and Technology System"]

[Text] From the provincial conference on Shanxi's scientific and technological work, which was in session from 25 to 30 April, this reporter learned that major reforms will take place in the province's science and technology system.

All those organs at or above prefectural and city levels which independently conduct research or develop science and technology are to adopt a system of contracted responsibilities for technological work, and will complete their transition from being organs financed with operational funds to organs applying the system of contracted responsibilities for technological work before the end of next year, and, in 2 to 3 years, are to become financially independent. Within this period the responsible departments signing contracts with them will allow them some preference in order to make it possible that they can still obtain some funds in the transitional period by signing technological contracts with the state. This preference will terminate in 2 to 3 years. The research organs are to become financially independent by enhancing their competitive power, submitting tenders, strengthening their horizontal ties, undertaking research projects, providing technological services, and marketing scientific and technological achievements.

Those research institutes which conduct research in the fields of agriculture, medical science, and public health, those which contribute to social welfare, those which provide scientific and technological services, and those which are involved in basic technological work will still be allotted operational funds through the original channels, and they will have to apply the system of contracted responsibilities. At the same time, units with the proper conditions will be encouraged to increase their income by various means and to gradually become completely or partially financially independent.

Research organs at the county level will be reorganized. Except those which really have research capabilities and those which have produced scientific and technological achievements, they will be reorganized or combined to form organs which provide technological service or popularize science and technology.

The province is going to open up some multilayered and multichanneled technology markets in various forms and, by means of extensive transfer of technologies, will teach people to understand and respect the value of technological achievements in order to make the departments responsible for the management of scientific research and the research organs decide on their research directions, arrange their research tasks, and add to the marketability of technological products on the basis of public demand and to encourage those research organs which develop technologies to merge with various enterprises and to speed up the transfer of scientific and technological achievements on the basis of the principle of voluntary participation and mutual benefit. In addition, it also will offer prizes in order to encourage scientific and technological advances. Prizes will also be given for major contributions to economic work and to technological advances which bring important social and economic results.

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SHANXI RIBAO COMMENTATOR ON TECHNOLOGY SYSTEM REFORM

HK200150 Taiyuan SHANXI RIBAO in Chinese 3 May 85 p 1

[Commentator's article: "The Presence of Pressure, the Presence of Vitality"]

[Text] Only when the reform of the science and technology system is made a must can we hope for the success of our reforms, find a way out, and rapidly develop the system.

Economic construction necessarily relies on science and technology, and science and technology must be geared to the needs of economic construction. Three years have elapsed since this principle was put forward as a basic national policy. Although the comrades on the economic, scientific, and technological fronts have done much, this problem has not yet been satisfactorily solved and the divorce between economic construction on one hand and science and technology on the other has remained a serious problem. It is still necessary to galvanize an entire army into picking peaches on the mountains. This shows that under the system currently in force, the pressure on enterprises is not great enough to force them to apply new technologies, and they do not have the vigor to serve economic construction or to gear their work to it.

Reform of the science and technology system accords with the will of the people and it is an important link in the reform of the economic structure. The reform of the science and technology system is focused on stimulating the vigor of scientific research units. Originally, scientific research and production were organically related. However, some outmoded systems have destroyed the connection between them and dampened the people's enthusiasm, thus becoming an obstacle to working out mechanisms of science and technology. We cannot facilitate the working of these mechanisms by sticking to old conventions. For a long time scientific and technological achievements have been unable to manifest their value in circulation, and the majority of scientific research units and scientific and technical workers have had neither confidence nor interest in the question of whether or not the fruits of their work would be recognized by society. The poor quality of the scientific research units and of their technical personnel and their false reputation can be accounted for in terms of the absence of a sense of value in these units. People have no idea of the value of scientific researchers and they are unaware of the value of gifted people. All this has seriously dampened the enthusiasm of the scientific research units and scientific and technological workers. The commercialization of science and technology is precisely aimed at putting an end to all this.

The reform of the science and technology system can force the scientific research units to speedily gear their work to the needs of the market, to strengthen their horizontal ties, to look for research projects in production and in enterprises, and to earn their income by producing economic results for society. In this way, pressure is exerted on scientific and technological work and it can be filled with vitality and vigor. The opening up of technology markets will lead to competition. In the course of competition, the fittest will survive and the unfit will be eliminated. In this way, in the course of competition, the scientific research units will be forced to pay attention to the social value and economic value of their achievements and to strive for marketable results. If a unit is completely free of pressure and without a sense of urgency and a sense of the times, it cannot properly combine scientific research with economic construction. The buying and selling of technological achievements in the market can put an end to the separation between various regions and departments and help us fully arouse the enthusiasm of the scientific research units and that of the scientific and technical workers. In this way, both the buying and selling parties can benefit from the market and we can find a basic solution to the problem concerning the intellectuals' work and living conditions.

CSO: 4008/349

REFORM OF S&T RESEARCH ANALYZED

Tianjin KEXUEXUE YU KEXUE YU JISHU GUANLI [SCIENTIOLOGY AND MANAGEMENT OF SCIENCE AND TECHNOLOGY] in Chinese No 3, 12 Mar 85 pp 19-22

[Article by Ji Dong [0679 2639] of the Multipurpose Bureau, National Science Commission: "My Humble View of the Key to and Breakthrough Point in the Reform of Scientific and Technological Research Systems"; Zhao Beiwang [6392 0554 2598], editor in charge]

[Text] Under the solicitude and guidance of the central leading body of the party and the State Council, the reform of scientific and technological research systems, through unceasing probing, has begun to find its way and stepped forward; the base line of socialist scientific and technological (hereafter S&T) development with Chinese characteristics has emerged. Analyzing the new situation in the reform of S&T research systems are the primary missions of the front line of S&T.

I. Key to the Development of S&T Research System Reform Is To Change to a Contract System for Operating Expenses

In economic reform, the implementation of the paid contract system has revitalized every cell of many research institutes, activated the whole body of S&T research systems and spurred on reforms related to the system of planning, investment, personnel, wages and leadership. Therefore, in the reform of S&T research systems, the implementation of the paid contract system is a big issue of great significance.

More than 80 percent of the independent natural science research organizations in our country are developing research organizations and about half of them are in the areas of industry, transportation and electronics. At present, 189 developing research institutes have implemented the paid contract system and have become self-sufficient. There are 535 research institutes which have started to conduct tests of the paid contract system with selected units and which expect to become financially independent within 2 or 3 years. The heart of the reform of the paid contract system is to change the way of appropriating operating expenses, to sign contracts with people outside the institutes and contract problems to people in the institutes. Thus the two big pots in which the institutes were fed by the state and individuals were fed by the institutes were removed,

departmental and local administrative bondage has been shattered and the institutions are open to the society; thus the management of the research institutes can make the transition from a system of administration to one of contract management. The paid contract system links up the appropriation of operating expenses for S&T research with the technical and economic responsibilities of the research unit and its technical personnel. It is a new type of management system which combines the management of planning, finances, material and personnel into one. Experiments indicate that the implementation of the paid contract system in industrial development research units can accelerate economic independence. In developing research units in realms such as farming and forestry, health care, meteorology, etc. where the speed toward economic independence is comparatively slow, multi-track reforms such as contract and fund systems can be implemented. A summary of the experiences of the experimental units indicates the primary effects of the paid contract system reforms as follows: 1. It promotes scientific research work in economic construction. The guiding principle of closely revolving around economic construction was set up from research plan to product management; most research units have established a joint organ with some plant, profession or district and have organizationally ensured the integration of scientific research and production. 2. It is advantageous in bringing out the initiative of S&T personnel. With task responsibility, a task group can be organized freely, thus reducing the internal cost of the scientific research unit and strengthening the sense of responsibility, of being one's own boss, of the S&T personnel. Also, the quantity of work undertaken generally increases 5-10 percent above that before the reforms. 3. It promotes the socialization of scientific research. The experimental units widely accept the tasks entrusted by society. In local scientific research units, the number of tasks across the board was generally 60 percent or more. Research units started to transfer their research results to other districts and other departments and thus acquired the independence to serve society. 4. It opens channels for research funds and increases the vitality of research units. By accepting entrusted tasks, opening technical services and consultation, transferring technical results and organizing scientific research production, they acquire income, increase their economic vitality and thus not only ensure their sovereignty in planning but also use it to improve the condition of the research unit and the livelihood of the personnel.

In about 2,000 independent research institutes which do basic research and applied research, the trial of reform in the scientific funding system has just started. The idea is that through appraisal by specialists in the same field, the finest among the most significant research items and research units and their research personnel who are most likely to have important results will be chosen and provided with research funds as an investment. This is done to guide research work toward those aspects which are judged to have the best application possibilities in the future, which are able to open new economic realms, which are suitable to the natural resources, manpower and production foundations of our country and which can also contribute to the world's S&T development. In the choice of topics, goals defined and control of results, research personnel must

be provided not only with more freedom and working space, but too much administrative interference should be avoided, direction and guidance of the plan by the state and the government must be stressed and a strict scientific research responsibility system must be established in research units to solve the problem of institutes or individuals depending on the big pot to earn a living.

In our country there are other kinds of research units such as observation stations, information units and standards and measurement research institutes, and about 400 of these units are engaged in both research and development and in the auxiliary work of science and technology. These units can be grouped as scientific service units. The size and number of staff members in these units should be fixed according to an approved task direction, and then management by the full responsibility system should be implemented, that is, the funds should be appropriated according to the budget of the work load and the scientific task, which will be the limit of funding and which is reviewed once a year. The units will manage the funds independently provided that the planned targets are attained, and the income and surplus will be disposed of by the unit according to relevant regulations.

To summarize the practice of the advanced units in the reforms which have emerged in recent years, the common experiences are:

1. Establish a leading group with courage, insight, a boldness to reform itself, good management and a reasonable structure. A leading group has two features. One is the implementation of a system in which the leader is responsible and the leader belongs to the pioneering type; the second is a reasonable structure, not only in the distribution of work but also in knowledge, ability and age.

2. The directions and tasks and the internal structure of the research institutes should be adjusted according to the needs of economic construction and the excellence of the unit, be open to society to serve production and construction and strengthen scientific research management. Many experimental units choose their topics and adjust the internal structure according to the needs of production and construction. For example, the machine industry department of the Beijing Institute of Mechanical Tools reorganized its facilities and integrated scientific research, trial production and production and marketing. The Institite of Applied Technology in the district of Su County, Anhui Province, in the formulation of its research and manufacturing plan, paid close attention to information from the market to feed back to S&T work, stressed using its excellence in technology and personnel and insisted on creating greater social and economic results as the beginning and end of scientific research.

A scientific research unit solves not only technical problems in research and development but also the more important problems such as popularization, exchange and application of products and technical products which can be exchanged on the market. Of course, in reform the research units should do a good job in storing technology, and their income should gradually become mainly technical.

3. Employ able people, establish a strict system of scientific research responsibility and give valuable rewards for innovations. Able people are capital and ideas are money. These units love, prize and respect able people. At the Jilin Municipal Institute of Electronics, they would rather use an able person who has "shortcomings" than a mediocre person who has no "shortcomings." They have promoted experienced technical engineering personnel to be leaders of the institute and have rapidly changed the face of the institute. These units trust the technical personnel in politics, give them a free hand in their work and care for their daily existence. In assignments, promotions and housing distribution, they essentially acknowledge the value of the labor of technical personnel. Especially in Beijing, Hebei, Hunan and Heilongjiang, great awards are given to innovators.

4. The crucial point lies in the extension of the independence of the research units. The separation of function between government and enterprises is the central problem in the economic reform of our country. Similarly, in the reform of S&T undertakings, there also exists the problem of the functional separation between government and research. In many places and departments, a series of policy regulations has been formulated; the independence of the research unit in planning, personnel, finance, materials and management has been extended, and the research unit has been given a free hand to develop in the society to compete freely in making the research unit a relatively independent and economically independent management entity.

II. Merchandizing Technical Results and Marketing Technical Merchandise Are the Breach in Scientific Research System Reform

In essence, S&T work belongs to the realm of economic activity. One of its major functions is to increase the accumulation of human knowledge and civilization, explore the unknown and organize forces to do basic research and basic applied research. Another major function is to utilize S&T knowledge to develop the current production realm and expand new production areas. The latter usually occupies 70-80 percent of a country's research capacity of development, or even higher. It is the key and nucleus of S&T management. In the management of this, we must respect both the inherent law of the research unit itself and economic laws, that is, the development law of the market to process the resource.

For a long time, many pieces of work in the realm of scientific research have been disjointed from the needs of economic development. They only "produced" articles for gifts, exhibitions, samples or technology of a incomplete set. Production was disengaged from demand. Moreover, the unrecognized use of technological results left the labor value of the research without acknowledgment and also encouraged the viewpoint of repetitious labor held by people who had no understanding of economics in scientific research.

There are many problems to be solved in moving from scientific research to the market. At present there are two. One is the lack of a technical

and economic assessment of research work. In the past, the research units did not care about economic competition but now they have to turn toward the economy and the "pain and redundancy" of competition. The measure is the adjustment of direction of investment and targets of investment. Another problem is the lack of market assessment. Despite the great volume of advanced results published in journals, conference proceedings and patent documents, those which can be developed into economic interests are few.

Our party and the State Council think very highly of the strategic value of S&T in economic promotion and clearly point out that in research, after gaining results, application must be promoted as soon as possible. Technical results must be organized for transfer from the laboratory to production, from military to joint civilian and military use, from coastal areas to the inland and from foreign countries to our country; the paid transfer of technical results must be implemented. The promotion and transfer of technical results are as important as their creation. In recent years, there has been a new situation in the promotion and application of technical results.

Establish organizations for technology exchange. At present, 1,113 technology exchange teams have been established in different places and municipalities in the country which both take care of the organizational coordination of research and development and promote the popularization and application of research results which enable production and demand to satisfy each other. Units such as the Tianjin municipal ministry of astronautics have also helped the bank improve technological progress loans and the introduction and absorption of technology. Recently, these trade exchange organizations united to form a coordinated national network.

Open technology markets. Tianjin Municipality was the first to raise the flag of the technology market and start an S&T store. Various places and departments have held many trade fairs for technology exchange. In Beijing, Wuhan, Shenyang, Chongqing, Dalian, Hangzhou, Xian and Chengdu alone, 8 municipalities since 1981, 34 large-scale trade fairs have been held, exhibiting 19,000 items of results and service, where 5,300 agreements to transfer and joint ventures were signed. The volume of transactions was worth 130 million RMB.

Accumulate experiences about opening technological markets and organizing the technological trade. Recently, the Hebei provincial party committee prepared to commend the advanced technology trade units to promote the development of the technology market.

Premier Zhao pointed out recently that under the conditions of a socialist commodity economy, technology is also a commodity; it can be circulated and traded. We must open the technology market to implement market adjustments in the price of technological results. He also pointed out that regarding technological results as a commodity and opening technology markets are breaches in the reform of scientific research systems. It is based on the reality of the technological, economic and social development of our country and a penetrating summing up of the experiences within and outside our country.

whether the researcher or the manufacturer has a diploma or comes from an "illustrious or respected family." This gives more hope for self-educated comrades to strive on and a chance for the middle-aged or young cadres naturally to take over the development of S&T. There is demand in the market, and technical personnel will be able to use their knowledge and skills to initiate innovations. The paid transfer of innovations confirms and encourages the capability of the researcher and his power in his research and thus gives greater stimulation to his initiative.

(4) It is advantageous for the elevation of research management.

The ultimate manifestation of the level of technical research management is the least input of manpower, money, materials and time and a maximum number of technical results (commodities and products). Many technical research units in many countries, including basic research and the preparation of applications, are doing cost-benefit (or expense and effect) analyses and regard them as the core of technical research management. The commercialization of technological results and mercantilization of technical commodities provide a direct measurement for input and output analysis and compels the leaders to make the correct choices on the priority of itess for research, to do well in forecasting production and demand, to make adjustments in the reasonable ratio of research and development personnel and of auxiliary technical personnel and workers and to avoid the unnecessary repetition of research work.

2. Aspects of the Management and Funding Systems for Research and Development

Commercialization of technical results promotes a change of emphasis, style, and method in the work of management and the funding units of research and development.

For many years there existed in the management system of our country an overly centralized power system which had the defect of overemphasizing the micro and under-emphasizing the macro. Just as Comrade Deng Xiaoping commented in his address in 1980, our leading organizations at various levels all interfered with many things that they should not have interfered badly or interfered when they could have no effect. We propagandize to simplify government and distribute power year after year but the organization grows larger and larger without distributing its power. Without a power distribution, naturally the government cannot be simplified.

In technical management, the principle is of course to serve and its major contents are organization, promotion and coordination.

To serve means to serve the implementation, utilization and market systems of research and development and to serve economic construction but not to substitute others' work or even to become a "grandma."

By organization we mainly mean the following: according to the guiding principle of S&T work facing economic construction, S&T development

The scientific and technological research system consists of four subsystems such as the research and development implementation subsystem, the research and development management subsystem, the technological result utilization subsystem and the subsystem which connects the above three subsystems, that is, the technology trade circulation subsystem. The commercialization of technological results and technical commodity mercantilization are breaches in the management reform of the above four subsystems.

1. Research, Development and Implementation System of the Technology Research Units

The implementation of the paid contract system, the scientific funding system, and of the operating funds appropriation with full responsibility system is the key to the reform of scientific research units. If this key is grasped, technological research will be revitalized and more technical results will be "produced." Only when technological results are transferred out can their value be felt and the vitality of the technological research unit be built on a solid material foundation. The two supplement each other and both are cuase and effect. Commercialization of technological results and technology mercantilization are necessities in the deepening and development of technological research system reform.

(1) Urge technical research personnel to face economic construction more consciously.

In working for technological research commercialization and technology mercantilization, the problem of what technical research personnel should or should not do is solved naturally. Technology enters into the market by paid transfers and thus embodies the labor value of the research personnel.

(2) Break through the limits of districts and departments.

Technological results are not limited by district or department and are transferred through payment in the market and traded by the two parts involved; all these are a form of liberation for the scientific research units and are beneficial to the functional separation of government and research. In the past, not a few places and departments stipulated that within a certain period of time after its acquisition, results could only be transferred within the district or department and some even stipulated that within the system the fee collected from the transfer should be low or simply free. This not only hampered the initiative of the technical research unit and encouraged the concept of the common rice bowl and equalitarianism but also resulted in a huge waste of research and development funds and redundancy in the organizational structure and of research items.

(3) It is advantageous for the realization of the party's policy toward intellectuals.

The technological market has opened the door wide for the knowledgeable and patriotic. The price of technological commodities does not depend upon

programs, plans and policies must be formulated and executed in order to forecast scientifically the prior fields of development, to define the task and topics, to organize technical personnel to handle the planning and tackle key problems, to organize the exchange and promotion of technical results, to face the challenge of the new technological revolution, to consider what direction to develop, what standard of technology to attain and what policies about technology and equipment to adopt, to combine in the situation of our country to give full scientific proof, in timely manner to follow up, research and grasp major international S&T developments and trends and to adopt policies to provide information for policy making by the party and government.

By promotion we mean to follow the principle of S&T development from the central government to promote the reform of S&T systems and to adjust the S&T system and the capacity of S&T. The promotion of the S&T system must be planned overall and solved step by step, and we must be cautious with those involved in a wide area. Never disrupt the research on an important topic; improve quickly the assessment and reward systems for technical personnel; draft and formulate S&T regulations and procedures and promote the reasonable circulation of technical personnel; and do well in the administrative work of utilizing S&T cadres. We must encourage them not to implement equalitarianism. Don't be concerned about saving face or one's history of service. Be concerned about contributions in technological advancements and economic interests. Formulate different policies and procedures to support S&T personnel to go to the basic level, to the faraway borders and to places where economic construction demands are greatest.

By coordination we mean mainly to bring the function of all the departments into full play. We must be a little bit unconventional in work, link up with other departments and mainly coordinate and guide but not directly manage technological entities or create new administrative entities.

Premier Zhao pointed out that in leading economic work one must depend first on policy and then on science and technology. The leading cadres who depend on S&T must do well with four things: first, bring the initiative of technical personnel into full play; second, assign tasks along the technical front; third, create conditions for technical research; and, fourth, open the way for technical research results to be used in production.

In a word, the style and method of the management system must change, and the content of the work must be changed to organize, promote and coordinate the technical results' commercialization and technical commodity mercantilization.

3. On the Utilization System of Technical Results

Users of technical results are not only production enterprises but also other units in the society. They can purchase from the market or bid on the technology they need and make progress in technology that is not totally dependent on the strength of their own units and ease the pain of seeking help through recruitment because of the insufficient technical

strength of their own units. More importantly, they can acquire from the market appropriate technology of a good quality at a low price in order to strengthen the power to make progress in technology to create greater economic benefit. Looked at from the angle of macroeconomic analysis, this is a more effective utilization of national technological resources.

4. On the Organizational Structure of Technological Trade and Circulation

If there exists, with visible commodities, another circulation system which is independent of the realm of resources and processing, that is, with invisible commodities and technological results, there exists too a circulation system (technology stores, technology markets, technology exhibts, technology trade fairs, etc.) which is independent of technological production systems (technical research units and personnel) and the consumer system (users of technical results). This can be termed the third property of technological work. For a long time, we despised the function of the third property, the labor value of technology circulation and trade, and even confused it with economic crime.

Many developed countries in the world put technological transaction amounts into their technological statistical index systems and treat them as an important source of income in foreign trade. In the past, in foreign trade there existed a tendency to value material-object trade highly but not technological exchanges, and this resulted in a great number of repeated imports which benefited foreigners at our expense. In fact, in the importation of material things, the proportion of technology occupies a great deal of the cost and is only neglected because of human error. In trade in our country, trade in the form of technology has existed just a few years, and it occupies a very tiny part of the gross national product. It does not decide the product according to demand but seeks a market for products. This shows that the technical research system in our country has not overcome the limits of natural economics. Without the establishment of a highly developed technology circulation system, the modernization of S&T can never be realized without a great increase in the gross transactions in technology, and the key function of S&T can hardly be developed.

To develop technology circulation systems, the following problems should be solved:

(1) The Labor Value of S&T Circulation and Trade Must Be Confirmed and Respected.

Since technology circulation creates value, naturally it expects some reward (commission), and naturally we need to establish organizations and systems to take care of technology trade. Using the experience of the circulation and management of visible commodities, the technology circulation mechanism should also be independently managed and be responsible for its own losses or gains. It can belong to the masses and can also be collectively or individually owned. No matter whether it is "official" or

"civilian," the administrative units should not interfere too much and should "separate politics from business."

(2) The Price System Must Be Properly and Reasonably Solved.

The pricing of technological commodities is very complex. In general we think we should consider the rate shared by the initial cost of research and development and the cost of indirect research and development (auxiliary costs), the extent of the application of the technical results and the profit it can bring, the factor of difficulty or ease (risk) in research and development and profit. We cannot indiscriminately use the old formula of initial cost plus profit that was used for material commodities. In view of the economic situation within and outside the country in setting the price of a commodity, one approach is to let the two parties negotiate and set a price and finish the transaction, thus enabling the regulating function of the technology market to work; the second is to use a great amount of propaganda to change the traditional corrupt custom of despising the value of technological commodities and technological personnel and to recover the true feature of technological value, so that the price can be negotiated according to a certain portion of the initial cost of the technological result or the amount sold after adoption or the amount of newly added profit.

Organizing and developing technology markets are the duty-bound tasks of a worker in technology circulation and trade, and he should not limit himself to theoretical arguments although most in practice serve both the "producer" of the technological commodity and also the "consumer" and thus have a better understanding of theory.

(3) Pass Better Legislation, Continuously Sum up and Exchange Advanced Experiences, Commend Those Who Are Bold To Explore.

Only by using the law as a standard and specification can our technology research work be developed in a healthy way. It is suggested that every unit and department of the S&T front line penetrate the market to do surveys and studies to analyze positive and negative experiences and listen, learn and use the advanced experiences of foreign countries as a mirror to formulate laws, regulations and systems that fit our national situation, benefit the opening up of the technology market and guide the rapid development of the technology market. Those units or individuals who have made great contributions in opening up the market deserve great rewards and this is also an important part of our national S&T reward system.

12909
CSO: 4008/312

NATIONAL DEVELOPMENTS

BRIEFS

XINJIANG SCIENCE, EDUCATION INVESTMENT--Urumqi, 16 May (XINHUA)--Xinjiang will allocate an additional 30 million yuan this year for education, science, culture, journalism and publishing, according to the budget adopted by the recent regional people's congress. In 1984, the investment was 640 million yuan. The new funds will go to scientific research, construction of an electronic research laboratory, a new laboratory for studying crops and a science hall. Xinjiang film studios also plan to produce and dub 53 films and increase the area of television coverage from 61 to 70 percent of the autonomous region. Last year, colleges and secondary professional schools in the region enrolled 19,000 students. [Text] [Beijing XINHUA in English 1315 GMT 16 May 85]

PATENT BUREAU APPLICATIONS--Beijing, 15 May (XINHUA)--China's Patent Bureau had received 4,700 applications, some from foreign businesses or individuals, by 10 May. "A total of 3,546 applications were filed on 1 April, when the country's new patent law came into force," said Ge Bo, deputy director-general of the bureau. Most applications are for new inventions, and others are for improvements and new designs. So far, about 4,000 patent agents have been trained and patent offices set up in most parts of China. At the head office in Beijing there are 207 patent examiners and an archive containing 30 million patent documents. [Text] [Beijing XINHUA in English 1535 GMT 15 May 85]

CSO: 4010/151

PRC COMMITTEE TO PUBLICIZE CHINESE MEDICINE

OW101747 Beijing XINHUA in English 1516 GMT 10 May 85

[Text] Beijing, 10 May (XINHUA)--China plans to set up a committee on the collection and publication of literature on traditional Chinese medicine, according to a national work meeting now in session here.

The meeting reported that China now has 54 libraries and information centers specializing in Chinese medicine, employing 1,300 people.

They have in their collections a total of 4.56 million books, some of them very rare. Books and periodicals on Chinese medicine published abroad have also been collected.

The workers are involved in collecting prescriptions and other literature to provide information for clinical use, research work and teaching. They have also exchanged information with their overseas counterparts.

China has 1,218 hospitals and 23 colleges of traditional Chinese medicine.

The field employs 320,000 people.

CSO: 4010/150

PRC DELEGATE REVIEWS HEALTH CARE ACHIEVEMENTS

OW082030 Beijing XINHUA in English 1619 GMT 8 May 85

[Text] Geneva, 8 May (XINHUA)--The chief representative of the Chinese delegation to the 38th World Health Assembly, Vice Minister of Public Health Chen Minzhang, said today, that China has achieved the first positive results of its reform of national health services.

In recent years under the new situation created by the overall reform of the economic system in both urban and rural areas, Chen said, the Chinese Government has been actively engaged in improving health care.

Chen said that new organizational modes are appearing such as health facilities financed collectively by the village administration and local people, or jointly set up by village doctors and health aides. There are also health institutions run by township hospitals and health services contracted out to individual village doctors.

At present, approximately 87 percent of China's villages and townships have access to medical treatment, drugs and health facilities, he added.

On the urban reforms, Chen said that the emphasis is on the provision of a scientific foundation for hospital management and its simplification for the convenience of people requiring medical treatment.

To make medical institutions at all levels play their role to the full and help medium- and small-sized hospitals improve their techniques, certain big-city hospitals have set up links with the latter and with factory and mine hospitals to form joint medical care units. The big hospitals send professional personnel to give medical guidance to the small hospitals and raise their technical level. There has been a relatively rapid increase of home hospitalization cases in recent years with the number of such cases reaching more than 200,000, said Chen.

Chen continued that the development of traditional medicine has been expanded. By the end of 1984, the number of hospitals practicing traditional medicine at county level or above had grown to 1,020, and 10 training centers for traditional medicine had been established in the entire country to train professionals in a variety of specialized branches.

Chen said at the end of his speech that China will continue to pursue its open policy and enhance its scientific and technological cooperation with friendly foreign countries and international organizations, continuously learning from the experience and methods of other peoples, to raise the health standards of the Chinese and attain the strategic goal of health for all by the year 2000.

The 38th world health session opened on 6 May at Geneva and is to close on 22 May.

CSO: 4010/150

LIFE SCIENCES

PROTECTION OF EYES AGAINST LASER DAMAGE STUDIED

Shanghai ZHONGGUO JIGUANG [CHINESE JOURNAL OF LASERS] in Chinese No 2, 20 Feb 85 pp 113-117

[Article by Guan Chongwen [7070 1504 2429], Wang Rongzhen [3769 1369 3791] and Jin Humei [6855 3337 2734] of Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences: "Study on the Protection of Eyes Against Lasers"]

[Text] Abstract: Potential hazards of lasers were analyzed from eye injuries caused by lasers over the years. Hygienic physical experiments were performed on "reflected laser light from hitting spots" which caused most eye injuries. Measures for the protection of eyes against laser damage were also discussed.

I. Introduction

Although various protective measures had been taken since laser was investigated, yet the essential problem of preventing laser damage to eyes is not resolved. Incidents of eye injury still occur in the world to laser researchers[1-3]. As lasers are further developed and the range of applications expands, more and more people are going to be exposed to lasers. Laser safety and protection has become a problem which requires further study in order to ensure safety in applications.

II. Potential Hazards in Lasers

It is generally believed that the directivity of a laser beam is very good. A reflected beam can be predicted. Therefore, it should be easy to prevent eye damage. As a matter of fact, this is not true. Because of the presence of inertia, human error, carelessness, lack of knowledge and getting used to old procedures, serious eye injuries due to accidental laser exposure are not uncommon. In order to prevent such accidents, warning signs marked "Danger Laser" as well as safety procedures and standards are also posted in laboratories. In addition, workers are also given various safety glasses. Why do eye injuries due to laser still occur? This is a problem worth examining.

Table 1 lists the hygienic physical analysis of apparent laser eye injury accidents happened in China and the U.S.

From Table 1 one can see that most of the incidents were not caused by direct laser beams. Instead, they were due to reflected laser light from the hitting spots. Generally, the cause to eye damage varies with the work involved. For instance, accidents happening in the field or during eye therapy are mostly caused by direct exposure to the laser. For the majority of laboratory workers, only 15-20 percent of the cases happened as a result of direct exposure to the beam. Most of the cases, approximately 80 percent, were injured by the "reflected light from the hitting spots."

Table 1. Factors Causing Laser Damage to Eyes

irradiation type / country	cases (eyes)	directly by laser	"reflected laser light"	scattering thru medium
China in 22 yrs. (until 1982)	11	2	8	1
In U.S. industry over 20 yrs.	7	1	6	
Total	8	3	14	1
Factor for laser damage to eyes (%)		16.6	77.8	5.6

Figure 1 is an analysis of potentials hazards of intense lasers to eyes.

III. Experimental Apparatus for Laser Hygienic Physics

When the laser beam accidentally enters the eye through the pupil, in most cases the damage to the eye ground occurs in the most sensitive area - the yellow spot zone. This is a cold fact.

Figure 2 shows an apparatus used to determine the intensity distribution of "reflected laser light from hitting spots" in order to prevent such accidental injury.

A Q switch DBN neodymium laser was used to emit a 1J, 50 ns wide laser beam at 1.06 μm onto four types of reflectors, i.e. flat glass, plexiglass, ground glass and ground glass with chalk dust. The incident beam is at a 45 degree angle with respect to the target. A 2DU detector array was used to measure the intensity distribution of light reflected from these reflectors. An appropriate attenuating filter was used in front of the diodes. The data was then sent into a microcomputer for processing and a printout was later obtained.

IV. Experimental Results and Discussion

The light from an ordinary source may be reflected or scattered at interfaces of various cleanliness. Figure 3 shows the aforementioned experimental results. When a laser pulse is reflected from a chalk dust covered ground glass surface, although it is scattered, yet the intensity distribution is not uniform. There is a more intense area which is conically shaped. Or, it is reflected by a "fake" mirror. Its solid divergence angle is much larger than we anticipated. It is very hazardous to the eyes.

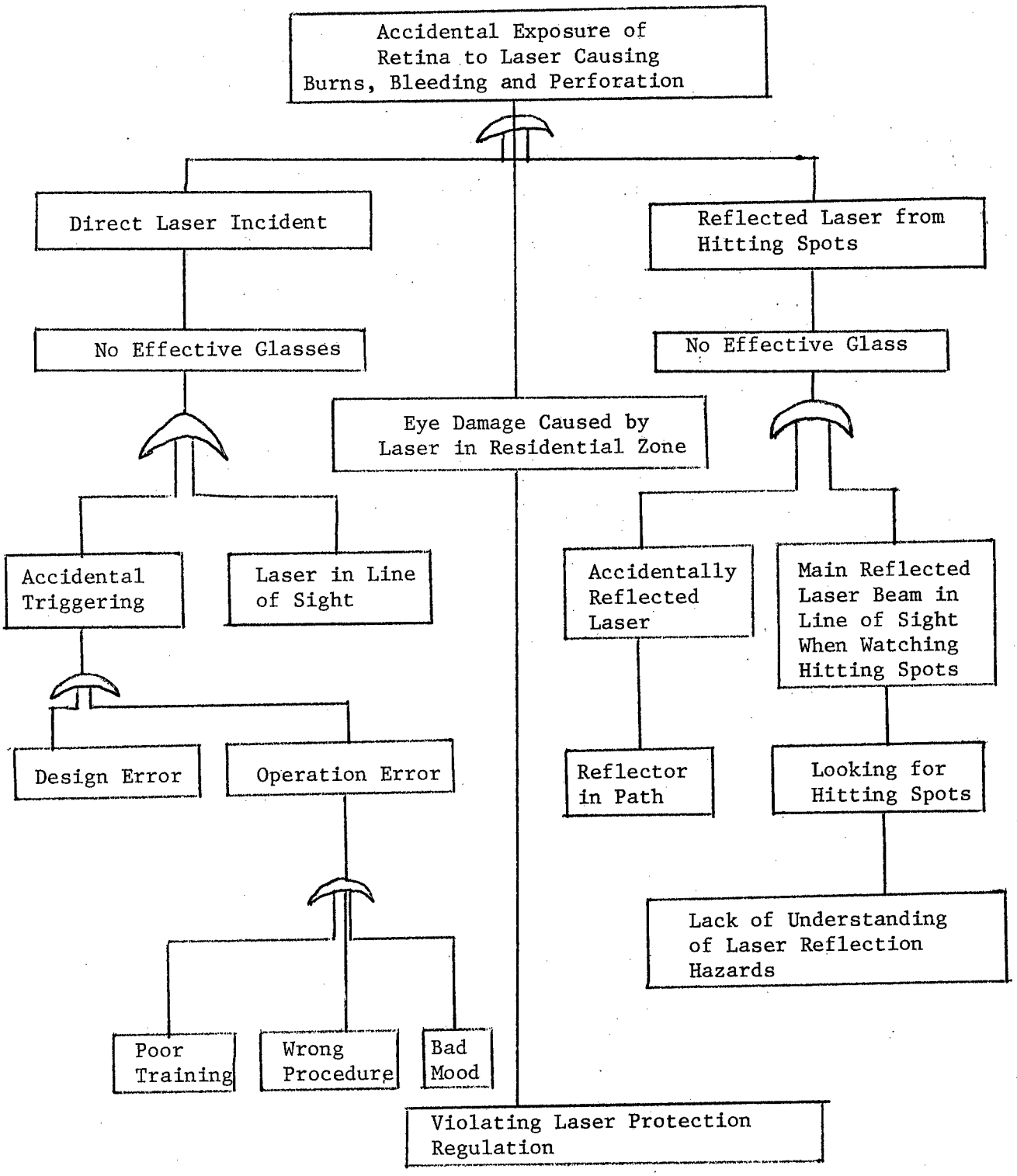

Figure 1. Logical Analysis of Eye Damage by High Power Laser

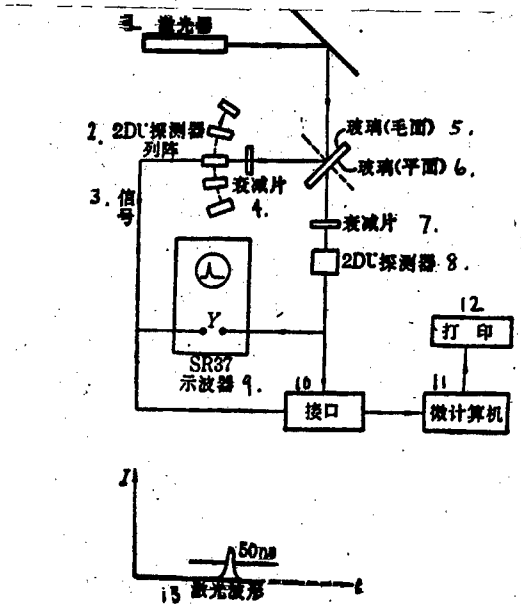

Figure 2. Schematic Diagram of Apparatus to Measure Angular Energy Distribution of "Reflected Laser Light from Hitting Spots"

Key: 1. laser 2. 2DU detector array 3. signal 4. attenuators
5. glass (ground) 6. glass (flat) 7. attenuator 8. 2DU detector
9. SR37 oscilloscope 10. interface 11. microcomputer 12. printer
13. laser waveform

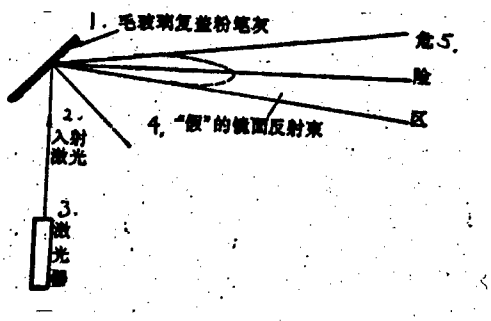

Figure 3.

Key: 1. chalk dust covered ground glass 2. incident laser 3. laser
4. reflected beam from the "pseudo" mirror 5. danger zone

If the potentially dangerous zone is in the invisible wavelength region, it is even more hazardous. Especially for workers near a laser, eye damaging accidents may occur if their line of sight happens to be in the danger zone.

It was also experimentally demonstrated that it is extremely dangerous to hold a target in the optical path and try to observe the spots while moving the target. Doing so is equivalent to aiming one's own eye ground with a laser. Even with protective glasses, eye damages cannot be avoided.

It was also experimentally shown that "reflected laser light from hitting spots" will be created as soon as any object, including any moving object, is introduced to the laser path. It is just as placing the eyes in front of an "optical machine gun" shooting "light bullets" wildly. The probability of causing eye injury is extremely high.

Laser researchers are required to handle laser targets in adjusting the optical path, taking measurements and processing with lasers. Sometimes, they are even required to stare at a laser spot. In reality, laser protection is to prevent eye injury from "reflected laser light from hitting spots".

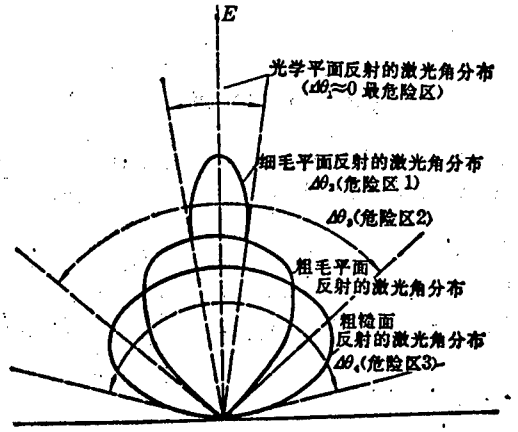

Figure 4. Angular Energy Distribution of "Reflected Laser Light from Hitting Spots"

Key: 1. angular distribution of laser reflected from an optically flat surface (most hazardous zone $\Delta\sigma 1=0$) 2. angular distribution of laser reflected from fine ground glass $\Delta\sigma 2$ (hazardous zone 1) 3. $\Delta\sigma 3$ (hazardous zone 3) 4. angular distribution of laser reflected from coarse ground surface 5. angular distribution of laser reflected from rough surface 6. $\Delta\sigma 4$ (hazardous zone 3)

Figure 4 shows all the hazardous zones with "reflected laser light form hitting spots." When a laser beam incidents perpendicularly into a reflector of a certain cleanliness, different light intensity distribution may result. There are different hazardous zones, i.e. the most hazardous and 1, 2, 3 and 4 zones, corresponding to various degrees of eye injuries.

Table 2 shows cases of eye injuries caused by 14 laser reflectors; 19 pairs of eyes were damaged by these reflectors. These objects, which are commonly seen in laboratories, caused serious consequences because they entered the optical

path. As another example, eye damage might be caused by the accidental exposure of splashed liquids to the optical path. For the researcher, it is a disaster from nowhere.

Table 2. Objects (Reflector) Causing Eye Damage by Laser Reflection

No.	Reflector	Number of Eyes Injured
1	various prisms	4
2	dielectric film	2
3	moving object	2
4	curved mirror	2
5	plexiglass box	1
6	human cornea	1
7	black paper	1
8	power meter	1
9	testing paper	1
10	reflection from microscope	1
11	glass window	1
12	splashing liquid	1
13	graph paper	1
14	chalk	1
	total	19

Table 3. Reflectivities of 61 Reflectors Commonly Encountered in Laboratories (for reference only).

No.	Reflecting Material	Reflectivity %	
		1.06 μm	0.53 μm
1.	aluminum foil	48	18.2
2.	chrome plated objects	46	46
3.	coated glass	34	9.2
4.	aluminum plate	26-31	13.8
5.	thin copper sheet	25.7-34.3	11
6.	small surgical knife	19.4	>55.2
7.	convex lens	7.7	5.5
8.	optical glass	4	4
9.	white ceramics	4	3.6
10.	electrical material (black)	3.75	1.6
11.	saw blade painted green	3.75	12-13
12.	window glass	3.4	2.8
13.	black paper	3.4	3.2
14.	plexiglass	3.4	3.5
15.	Brewster angle	3.2	3.2
16.	green plastic	3	1.6
17.	yellow glass bottle	2.9	2.2
18.	green wall	2.8	1.5
19.	yellow plastic tube	2.6	1.8
20.	blue plastic tube	2.0	1.6
21.	computation paper	2.0	1.7

22.	smooth plastic bubbles	1.8	2.1
23.	white chalk	1.8	1.7
24.	green plastic tube	1.7	1.4
25.	shim (iron)	1.6	1.6
26.	white clay wall	1.5	1.4
27.	fiberglass tube jacket	1.5	1.6
28.	blue cotton work outfit	1.4	0.2
29.	carbon paper	1.4	0.4
30.	red plastic tube	1.3	1.0
31.	pig cornea	0.8-1.2	0.6
32.	wood plank	1.1	0.7
33.	white work jacket	1.0	1.0
34.	cornea	0.8	0.7
35.	fire retarding brick	0.8	0.5
36.	grey canvas	0.8	0.5
37.	white work outfit	0.7-0.8	0.8
38.	belt (white)	0.64	1.0
39.	pork liver	0.6	1.7-2.0
40.	pork sclera	0.6	0.2
41.	foam rubber tube	0.6	0.4
42.	inner retina	0.5-0.8	0.8
43.	coarse plastic bubbles	0.5	0.6
44.	pork fat	0.5	0.4
45.	8 layers of bandage	0.5	0.8
46.	surgical glove (new)	0.5	0.4
47.	tracing paper	0.45	0.6
48.	surgical glove (used)	0.4	0.3
49.	single layer of bandage	0.4	0.6
50.	neodymium glass		0.2
51.	human hand (female)	0.3	0.4
52.	human palm (female)	0.3	0.24
53.	latex tube	0.3	0.1
54.	rusted iron	0.3	0.3
55.	ground glass	0.3	0.3
56.	outer skin of multi-strand wire	0.25	0.2
57.	double convex lens, ground side	0.25	0.2
58.	grey plastic tube	0.24	1.0
59.	human hand (male)	0.2	0.3
60.	human palm (male)	0.2	0.4
61.	black plastic plate	0.2	0.6

Table 3 lists the reflectivities of 61 reflecting objects commonly encountered in laboratories for reference. They were tabulated in such an order that to some extent the table represents the degree of hazard of "reflected laser light from hitting spots" to the eyes.

In laser experiments, laser reflection should be avoided as much as possible. In some applications, it is difficult to completely eliminate laser reflection. Protective measures must be deviced according to the intensity distribution of the reflected laser. For example, laser intensity is very high between the most dangerous area and danger zone 1. Protective glasses alone

may not be sufficient. A shield or light absorber may be used to solve this problem. Between danger zones 2 and 3, we should first use protective shields and safety glasses.

In reality, many researchers do not like to wear safety glasses because the room is already very dark which further limits the ability to see and to work. In addition, because of the availability of a large number of tunable lasers, laser beams of various wavelengths coexist in the laboratory which makes safety glasses less effective.

To improve the quality of laser safety glasses, we believe they should transmit more light to enable the operator to see the displays of various instruments better, as well as to ensure quick and accurate action in operating the high voltage charge/discharge unit. The primary function is to prevent scattered laser light. Secondarily, they should be light and comfortable to wear. As for protection from intense laser light, shields should be used to solve the problem.

The optical path of the laser must be strictly controlled for safety reasons. High power laser should be transmitted in sealed pipes or with various shields to ensure a leak free path.

Danger signs should be posted (such as red line markers or signs) if the laser cannot be sealed temporarily. An exposed laser beam should be treated as a naked high voltage wire.

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12553
CSO: 4008/274

BRIEFS

GANSU RADIATION CENTER--Lanzhou, 25 Mar (XINHUA)--The construction of China's largest radioactive technology development center has started in Lanzhou, Gansu. This is an important project, through which the state-run No 404 Plant transfers defense technology to the civilian sector. The establishment of this center will provide new technical means for storing, shipping, disinfecting, and preserving the freshness of melons, fruits, medicinal herbs, hide, and fur, which abound in Gansu. [Text] [Beijing XINHUA Domestic Service in Chinese 0028 GMT 25 Mar 85 OW]

SHANGHAI-FRG BIOLOGICAL LABORATORY--Shanghai, 4 Apr (XINHUA)--The Biological Laboratory for Guest Researchers, planned and built by the Shanghai Cyto-Biology Institute of the Chinese Academy of Sciences and the Development Biology Institute of FRG's (Mapu) Association, began operation in Shanghai today. Both sides provided funds and equipment for this laboratory, which will be used by scientists of both countries for cooperative study in the fields of development biology, cyto-biology, and molecular biology. It will also provide conditions for training young scientists of the two countries. [Text] [Beijing XINHUA Domestic Service in Chinese 1210 GMT 4 Apr 85 OW]

HEILONGJIANG MEDICAL LOANS--The World Bank decided to issue $8.5 million to Suihua, Beian, Shangzhi, Boli, Nehe, Keshan, Hailun, Fujin, Ningan, and Binxian Counties in Heilongjiang Province to build rural public health facilities, train medical personnel, maintain equipment, repair instruments, and build statistical information centers. This June, some $5.2 million worth of instruments and equipment will be imported from Japan and the United States. Meanwhile, the World Bank will pay the province $1.13 million to train medical personnel. [Text] [Harbin HEILONGJIANG RIBAO in Chinese 19 Apr 85 p 1 SK]

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TITLE: "Gene Pool of Bombyx Moni Nuclear Polyhedrosis Virus"

SOURCE: Beijing ZHONGGUO KEXUI--B Ji [SCIENTIA SINICA, Series B] in Chinese No 9, 1984 pp 805-810

ABSTRACT: This paper reports on the gene constitution of DNA of Bombyx moni Nuclear Polyhedrosis Virus (BmNPV) subjected to electrophoresis and isolated with agar-agar gel following an internal cut of an enzyme with limitation; 29 fragments differing in size from 0.70 to 10.0 kb were obtained. The in vitro recombination (between the DNA fragments obtained and the corpuscles pBR 322 DNA of SalI enzyme dissolution) was transplanted into Escherichia coli HB 101 mycorrhiza, yielding the recombined corpuscles with cloning mycorrhiza. Through determination based on molecular weight of eight SalI enzyme fragments inserted in the recombination DNA corpuscles, DNA hybridization by Southern's method, and multiple enzyem scission sites of limited internal-cut enzyme, 24 fragments (of different sizes) of BmNPV DNA were cloned into the corpuscles pBR 322. The total length of cloned DNA fragments account for 80 percent of the virus gene combined DNA.

One table shows the BmNPV DNA fragments dissolved with SalI enzyme and the recombination corpuscles. Four figures show the SalI enzyme dissolution electrophoresis diagram of BmNPV DNA, the DNA gel electrophoresis diagram of recombination corpuscles DNA, and DNA gel electrophoresis and Southern's analytical results for seven randomly selected recombination corpuscles DNA.

The authors express their gratitude to Dai Peihua [2071 1014 2901] for his photographs, to Zhu Shengzu [2612 4939 4371] and Lu Huifen [7120 1920 5358] of the enzyme section of the authors' office for providing enzyme products such as EcoRI. The first draft of the paper was received on 21 April 1983; the final revised draft was received on 5 September 1983.

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ORG: All of Shanghai Institute of Organic Chemistry, Chinese Academy of Sciences

TITLE: "Biological Activity of Crude Venom of Centipede"

SOURCE: Beijing KEXUE TONGBAO [SCIENCE BULLETIN] in Chinese No 3, 1985 pp 218-220

ABSTRACT: The use of Scolopendra subspinipes mutilans Koch, one variety of centipede, for treating infantile convulsions, erysipelas and scabby head (among other diseases) has been long practiced in China. This paper reports on the preparation and biological activity of venom (freeze dried secretion liquor from the palate) of Scolopendra subspinipes mutilans Koch. The main content of the venom is protein, with medium toxicity in small mice if enternally injected with small doses. In this case, the mice showed restlessness, asthma, coiling in prone position, spasm and weakening respiration for several hours before death or gradual recuperation. With large injected dose, the mice became immediately extremely restless and jumping. Death came after several minutes of spasm. In the venom, there are certain activities of protein hydrolytic enzyme, esterase, and esterase phosphate causing hematolysis. One table shows the quantitative characteristics of venom and substrates. When p-nitrobenzo-ester is used as substrate, there are activities of alkaline mono-esterase phosphate (of the venom) within the pH range 8.0 to 10.5; as shown in one of three figures, the optimal pH is 9.5 for hydrolysis. Two remaining figures show the effect of magnesium on the activity of alkaline mono-esterase phosphate in the venom, and the relationship between venom concentrations and dissolving percentages of sheep red blood cells.

10424
CSO: 4009/233

Cement Industry

AUTHOR: SUN Xiao [1327 1321]

ORG: Mudanjiang Cement Plant

TITLE: "Microcomputer-Operated Bucket Hoist Electronic Scale"

SOURCE: Beijing SHUINI [CEMENT] in Chinese No 1, 10 Jan 85 pp 11-12

ABSTRACT: After nearly 3 years' development by the Heilongjiang Provincial Electronics Institute and Mudanjiang Cement Plant, a microcomputer-operated bucket hoist electronic scale passed provincial certification in December 1983. The scale was installed on a 15-ton crane type bucket hoist, and weighs 15 kilograms. Two weighing sensors can detect loads as light as 10 kg to a precision better than 2 percent. Some errors are caused by mechanical wear, hoisting vibration, swinging and uneven forces acting on the ropes. Signal amplification, calculation, display and printout are handled by the microcomputer, showing the total weight in successive weighings totaling up to 10,000 tons. The process is wholly automatic, using 220 volts alternating current as environmental temperatures between -10 and +60°C. The electronic scale has operated quite steadily in weighing the raw materials and solid fuels in a warehouse. Two figures show a flowchart of scale operation, and the signal wave profile. One table lists performance data.

10424
CSO: 4009/136

Cement Industry

AUTHORS: LIU Yongxi [0491 3057 5045]
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ORG: All of Hefei Cement Research Academy

TITLE: "Ash Removal Using a Microcomputer-Controlled Bag Type Dust Collector"

SOURCE: Beijing SHUINI [CEMENT] in Chinese No 1, 10 Jan 85 pp 13-15

ABSTRACT: A microcomputer can be used to control relays for dust removal using fiberglass bag dust collector. There are two control methods: by time and by pressure difference between a workshop and the air inlet of the dust collector. The control system consists of a single-board microcomputer, an interface circuit, and peripheral equipment. Users can use an input/extput PIO (with eight ports) to gain access to the microcomputer. The central processing unit (PCU) can alter the configuration of the Z-80 PIO to connect to various types of peripheral equipment without any additional logic. For pressure-difference dust collection, a pressure difference transmitter can convert millimeters of water column into voltage signals, which are digitized through an analog-to-digital converter for calculation and logic decision making by the microcomputer. The system software was written on a trial basis; simulation tests for software of intervening-time ash removal were conducted. Test results show the operational control logic and program. The software for pressure-difference control was also written but on-site test remained to be done. Further study is required to enhance the control effect of the system, to sufficiently exploit the microcomputer potential, and to adapt to on-site use conditions in order to steadily and reliably operate the system. Four figures show flowcharts of the entire system, interface circuit and software, as well as photoelectric separation circuits.

10424
CSO: 4009/136

AUTHORS: YU Shuzheng [0151 2579 2973]
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TITLE: "Microcomputer Used for Predicting Strength of Chamotte and Cement"

SOURCE: Beijing SHUINI [CEMENT] in Chinese No 1, 10 Jan 85 pp 20-22

ABSTRACT: In 1983, the Huaxin Cement Plant began to use a microcomputer to predict strengths of chamotte and cement, applying the multiple regression method in mathematical statistics. Strength predictions on chamotte and No 525 slag silicate cement were made, gradually applied to production control. For the No 525 cement, 10 regression factors are used: KH, fCaO, C_3A and 28-day strength prediction value of chamotte, surface-to-area ratio of cement, slag blending amount, SO_3 content, as well as compressive strengths of cement at 3 days, 7 days and 28 days. In the most recent data, the precision of 28-day strength of No 525 cement was 1.17 percent for the standard deviation. By using the strength prediction for chamotte, the blending ratios of cement production can be controlled, thus providing quicker signals of cement quality control and enhancing economic benefit. Anomalies of measured data can lead to timely discovery of irregular operation. Within a period of half a year, the economic benefit was 61,300 yuan. For No 425 slag dam cement, the blending quantity of slag was increased by 2.62 percent, the best value ever, with a direct economic benefit of 44,000 yuan. A table lists average, maximum and minimum errors, as well as standard deviations of chamotte and cement. A flowchart shows the calculation of strength prediction.

10424
CSO: 4009/136

Chemistry

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XUE Enyu [5641 1869 6877]
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TITLE: "Preparation and Flame Retarding Properties of Some Antimonides"

SOURCE: Shanghai HUAXUE SHIJIE [CHEMICAL WORLD] in Chinese Vol 25 No 11, 20 Nov 84 pp 410-414

ABSTRACT: Antimony trioxide is a well-known, typical antimony flame retardant; however, the compound is not soluble in water or organic solvents, and it is very difficult to uniformly coat or spray its microparticles onto the surface of substances for the purpose of flame retardation. Preparations of antimony triethylamine, tetrabromophenate A, antimony glycol salt (zinc), colloidal antimony pentoxide, basic antimony gallate, and boro-antimony citrate are described together with their flame retarding properties against vinylon, cotton, rubber and polyester; data are listed in some of the 11 tables in the article. Since the above-mentioned antimonides have desirable solubilities and dispersivities, they can be uniformly dispersed onto the surface of substances for flame retardation. When flame is present, antimony oxybromide is formed to suppress the fire.

At present, Yao Baoshu works in the Tianjin Light Industry College; Ji Xueping [4559 7185 5493] et al. (graduates of the 1983 class of Hubei University) also took part in some experiments.

10424
CSO: 4009/1003

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TITLE: "Separation of Gallium From Strongly Alkaline Sodium Aluminate Liquor by Extraction With Kelex 100"

SOURCE: Shanghai HUAXUE SHIJIE [CHEMICAL WORLD] in Chinese Vol 25 No 12, 20 Dec 84 pp 442-443

ABSTRACT: Gallium ore rarely exists in nature but is often accessory to aluminum and lead-zinc ores. At present, aluminum-gallium ore is the main source of gallium. In 1979, the study of the solvent method in extracting gallium from alkaline sodium aluminate solution began in China. Experiments revealed satisfactory results of using Kelex 100 for gallium extraction from aluminate solution; further isolation of aluminum from gallium can be realized by a reverse extraction process as shown in a reversible chemical equation in the text. The extraction agent Kelex 100(HL) is made (on a trial basis) by the Shanghai Institute of Organic Chemistry, designated with the code N_{601} extraction agent. The total recovery rate by this method is higher than others because of multistage reverse extraction during simulations. Metallic gallium as high as 99.99 percent pure can be prepared, though the extraction is slow. Another challenge is how to substitute the made-in-China extraction agent for the imported Kelex 100.

One flow chart shows gallium recovery from aluminate solution. Two tables show the effect on the gallium extraction rate of different concentrations of Kelex 100--kerosene solution, temperature and contact time.

10424
CSO: 4009/1013

AUTHOR: GAO Jiaju [7559 1367 7467]

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TITLE: "Problems in Designing Ultrahigh Pressure Container"

SOURCE: Shanghai HUAXUE SHIJIE [CHEMICAL WORLD] in Chinese Vol 25 No 12, 20 Dec 84 pp 459-461

ABSTRACT: A typical ultrahigh pressure technology for use in petrochemical production is polyethylene technology; the first such installation was built in 1939 in Germany operating at 1500 atm. However, up to the present China still lacks specifications for designing containers capable of withstanding 350 to 10,000 kg/cm^2. Faced with rapid development of technology and production, the requirement for these specifications is self-evident. Therefore, unified technical directives are urgently required for ultrahigh and relatively high pressures. This paper mainly deals with problems raised in designing containers or pipelines operating at pressures between 1,000 and 10,000 kg/cm^2. Design considerations of following aspects are discussed: criterion of ineffectiveness, fracture ductility, anisotropy, testing requirements, corrosive media, control of sulfur and phosphorus contents, high and ultrahigh strength steels, optimal matching between strength and plasticity, heat treatment norm, and prestressing.

Three tables show the recommended strength of high and ultrahigh strength steels, strengthen weakening coefficient at design temperatures, and nonoptimal calculation result if designed according to the criterion of elasticity ineffectiveness (yielding point).

10424
CSO: 4009/1013

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TITLE: "Anodic Far-UV Photoresist. I. A Study of Poly(styrene-sulfone). II. A Study of Fluorescence Spectra of Poly(styrene-sulfone)"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 408-413, 414-419

TEXT OF ENGLISH ABSTRACT: Poly(styrene-sulfone) has been synthesized and evaluated as an anodic far-UV resist for high resolution lithography. The resolution is 0.75 μm. The sensitivity is approximately 6.5-fold higher than that of PMMA. In this work we have found that the sensitivity depends greatly on the molecular weight and film thickness. The bigger the molecular weight, the higher the sensitivity. The thinner the thickness, the higher the sensitivity. Hydroperoxide and carbonyl group were observed during irradiation by the measurement of IR and UV spectroscopy.

The photo-oxidation reaction of poly(styrene-sulfone), a novel anodic far-UV photoresist, including film and solution, has been studied by fluorescence spectra. The fluorescence intensity of poly(styrene-sulfone) decreased gradually with the duration of exposure. This phemonema was also observed when a trace amount of aromatic hydrogen peroxide or carbonyl compounds was introduced to poly(styrene-sulfone) which was without irradiation. It indicated that the quenching of the fluorescence of poly(styrene-sulfone) after irradiation was related to the formation of hydrogen peroxide or carbonyl group during the process of photo-oxidation.

This method can evidently be used for studying the starting period of the photo-oxidation of polymers. The mechanism of photo-oxidation of poly(styrene-sulfone) is discussed based on these results.

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LI Zhongzhi [2621 1813 1807]
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ORG: All of Changchun Institute of Applied Chemistry, Chinese Academy of Sciences

TITLE: "Synthesis of Long Sequence Copolymers of Ethylene-Butadiene"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 420-425

TEXT OF ENGLISH ABSTRACT: The copolymerization of ethylene and 1,3-butadiene with rare earth catalysts was investigated. It was found that ethylene and 1,3-butadiene were copolymerized to give high molecular weight products. Solvent extraction of crude copolymer indicated that there was no polyethylene, but about 8 percent polybutadiene was present. The products obtained have been confirmed to be copolymers containing long ethylene-ethylene sequences by DSC, X-ray diffraction and electron microscope. The butadiene unit in the copolymer was almost exclusively in the cis-1,4 structure. X-ray crystallinity was of the polyethylene type, with a slight variation of the structure parameters. The melting temperature, crystallinity and crystallite size increased with the increasing ethylene unit content.

AUTHOR: LIU Xueshu [0491 1331 1859]
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WU Kunshan [0702 0981 1472]
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TITLE: "A Study of Plasma Polymerization of Hexafluoropropylene and the Structure of the Polymer"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 426-430

TEXT OF ENGLISH ABSTRACT: The polymerization of hexafluoropropylene was studied by means of an apparatus with capacitive coupling of the external electrode. We have obtained better polymerization conditions and proved the effect of the obvious etching in the polymerization system with increasing discharge power. This effect was controlled by hydrogen as plasma gas. The results of X-ray diffraction and elemental analysis show that the polymer has a cross-linked structure. We have determined the contact angle and refractive index of the plasma-polymerization film of hexafluoropropylene. The film obtained exhibits good optical properties, hydrophobic properties and thermostability.

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ORG: All of the Institute of Chemistry, Chinese Academy of Sciences

TITLE: "Synthesis of Silicon Monomers and Oligomers Containing Cyclohexylene Ring"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 431-436

TEXT OF ENGLISH ABSTRACT: 1,3-bis (trichlorosilyl) cyclohexane was obtained by adding $HSiCl_3$ to cyclohexadiene-1,3 in the presence of $H_2PtCl_6 \cdot 6H_2O$ in isopropyl alcohol. The new compound was ethanolyzed and methylated to form di-methyl tetra-ethoxy disilyl, tri-methyl tri-ethoxy disilyl and tetra-methyl di-ethoxy disilyl cyclohexanes.

The di- to tetra-functional monomers were hydrolyzed by hydrochloric acid in ether. The di-functional monomers yielded cyclic dimer similar to octamethyl-cyclotetrasiloxane, and the tri-functional monomer, a cyclic tetramer, while in the case of the tetra-functional monomer a cyclic octamer was obtained. All these compounds have not been reported in the literature up to now.

AUTHOR: HE Guoren [0149 0948 0088]
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TITLE: "The Computational Multipeak Resolution Method for the X-ray Diffraction of Solid State Cured Polyphenylene Sulfide"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 437-441

TEXT OF ENGLISH ABSTRACT: A computational multipeak resolution method for X-ray diffraction has been applied to the powder of solid state cured polyphenylene sulfide (PPS). It was found that the crystallinity of PPS powder decreased during the solid state curing, while its average crystallite volume and area of the basic planes of the crystallites increased. The chemical and physical processes in solid state curing of PPS are discussed and compared with the results of thermal analysis.

AUTHOR: CHEN Heming [7115 7729 7686]
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SHA Meilan [3097 5019 5695]

ORG: All of Chenguang Chemical Industry Institute

TITLE: "Studies of the Effect of Hydrochloric Acid on the Radiation Induced Graft Copolymerization of Acrylic Acid to Polytetrafluoroethyene"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 462-465

TEXT OF ENGLISH ABSTRACT: By the direct radiation grafting technique, effects of hydrochloric acid on radiation induced graft copolymerization have been studied. The experimental results show that the presence of hydrochloric acid markedly enhanced the grafted amount of acrylic acid to polytetrafluoroethyene. From the cross section and surface of the grafted film and its thickness change, it is found that grafting takes place on the surface of polytetrafluoroethyene by the presence of hydrochloric acid. The reason is that the presence of hydrochloric acid will promote existing hydrogen abstraction reactions from the grafted chains to give more grafting sites. The outermost layer is the homopolymer of polyacrylic acid, which is linked by chemical bond with the grafted copolymer, hence its adhesiveness to epoxy resin becomes greater.

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ORG: All of Changchun Institute of Applied Chemistry, Chinese Academy of Sciences

TITLE: "The WAXD Spectra of cis-Polybutadiene One Containing Trans-1,4-Units and Another Syndio-1,2 Units"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 466-470

TEXT OF ENGLISH ABSTRACT: The results of the WAXD analysis of cis-polybutadiene containing trans-1,4 units, synthesized with dual catalyst (vanadium- and cobalt-based) systems, and cis-polybutadiene containing syndio-1,2 units, synthesized with two cobalt catalyst systems, are presented in this paper.

The crystallinity of both cis-polybutadienes was proved to be contributed to by the presence of trans-1,4 polybutadiene sequences and syndio-1,2 polybutadiene sequences respectively in the cis-polybutadiene.

The degree of crystallinity of the polymer is increased with the increase of trans-1,4 content in the cis-polybutadiene containing trans-1,4 units and with that of syndio-1,2 content in the cis-polybutadiene containing syndio-1,2 units. From the relationship between the degree of crystallinity of the polymer and trans-1,4 content or syndio-1,2 content, it is shown that the degree of crystallinity of homopolymer blend is higher than that of copolymers. The blends hold the transition feature of crystal modification, but this is not so for copolymers at 50°C.

AUTHOR: ZHANG Qiming [1728 0796 2494]
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ORG: Both of the Institute of Photographic Chemistry, Chinese Academy of Sciences

TITLE: "A Study of the Photosensitization of Modified Poly-(Glycidyl Methacrylate)"

SOURCE: Beijing GAOFENZI TONGXUN [POLYMER COMMUNICATIONS] in Chinese No 6, Dec 84 pp 475-479

TEXT OF ENGLISH ABSTRACT: A PGC series was obtained by the esterification of poly-(glycidyl methacrylate) (PGMA) with cinnamic acid. NMR was used to determine the degree of esterification. The content of cross-linking under irradiation was quantitatively measured by UV, and confirmed by the gel-content test. It was found that the introduction of cinnamic acid greatly increased the sensitivity to the dfarp UV. Thus, PGC is a highly sensitive negative resist and does not need the addition of any sensitizer.

9717
CSO: 4009/185

Computers

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TITLE: "Vectorization for Loops With Trifurcated Jumps"

SOURCE: Beijing DIANZI XUEBAO [ACTA ELECTRONICA SINICA] in Chinese No 5, Sep 84 pp 27-35

ABSTRACT: Trifurcated jumps is a control configuration in computer program design. Three-condition branching is based on discriminating conditions. Since our purpose is to use vector calculation instead of quantitative calculation, the paper only considers trifurcated jumps of a DO loop, referring to Wu Mingxia [0702 2494 7209] and Chen Huowang [7115 3499 2489]: "Vectorization of Series Processing" in JISUANJI XUEBAO [COMPUTER JOURNAL], No 3, 1981, and L. Lamport: "Coordinate Method of the Parallel Execution of DO Loops," Proceedings of the 1973 Sagamore Computer Conference on Parallel Processing, 1973. The vectorization problem of general trifurcated controlled jumps in DO loops is discussed in light of the results of another author's paper, "Vectorization of IF Statement and GOTO Statement," in ZHONGGUO KEXUE [SCIENTIFIC CHINA], No 8, 1983. Fifteen examples are cited in the paper with programs written in FORTRAN, abiding by the American National Standard Program Design Language FORTRAN (one complete volume), in a Chinese journal DIANZI JISUANJI DONGTAI [ACTIVITIES OF ELECTRONIC COMPUTERS], No 1, 1980. The author expresses his gratitude to Liu Huimin [0491 2585 2404], Guo Qiong [6753 1730], Li Ling [2621 0407] and Wu Jian'an [0702 0256 1344] for their assistance in mathematical simulation. The first draft was received in May 1983; the final draft was completed in March 1984.

10424
CSO: 4009/135

JPRS-CST-85-019
18 June 1985

AUTHOR: XING Shengdi [6717 0524 1229]
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ORG: XING of Zhejiang University, Hangzhou; YU of Jilin University, Changchun

TITLE: "The Valence-Electron Structures and the Mechanical Properties of an Intermetallic Compound Ti_3Al"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 28 Feb 85 pp 62-70

TEXT OF ENGLISH ABSTRACT: Based on the empirical electron theory of solids and molecules, the bond-lengths difference method is applied to the analysis of the valence electron structures of α-Ti, ordered and disordered crystal structures $Ti_3Al(o)$, $Ti_3Al(d)$ and the ordered $Ti_6AlGa(o)$. The hybrid levels of Ti, Al and Ga belonging to the respective discontinuous hybridization of two atomic states are decided in these materials. Consequently, the respective total covalence electron numbers Σn_C, total lattice electron numbers Σn_L and total valence electron numbers Σn_T in these structures are obtained. The average values $\eta = \Sigma n_C/\Sigma n_T$ are also calculated. It is found that there is a parallel correspondence between the electronic parameter η and the mechanical parameters, such as cohesive energy (u), yielding strength (σ_y) and the cracking deformation parameter (ε_c).

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TITLE: "A Novel Plasma Emission Source"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 28 Feb 85 pp 90-92

TEXT OF ENGLISH ABSTRACT: A novel microwave plasma emission source (MPT) is reported for the first time. MPT is sustained at the end of an open "cavity." The flame-like plasma can easily be ignited and sustained with Ar, He or N_2 at various flow rates under a wide range of microwave power supplies. Sample solutions can be introduced via a conventional nebulizer system with the aid of a peristaltic pump and not significantly change the stability.

It is shown that halogens and other nonmetallic and metallic elements can be easily excited by MPT operated with He. It is expected that MPT will be a powerful competitor for ICP.

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TITLE: "TEACHER--A System Teaching Programming Language"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 28 Feb 85 pp 115-118

TEXT OF ENGLISH ABSTRACT: A computer system named TEACHER, built in 1982, is described. The theoretical basis and implementation on the computer are introduced. This is a system teaching programming language. At present, the system can teach FORTRAN, LISP and BASIC. The system will teach each student at the rate best suited to the individual.

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TITLE: "An Algorithm of Linear Realization of Finite Automation"

SOURCE: Changchun JILIN DAXUE ZIRAN KEXUE XUEBAO [ACTA SCIENTIARUM NATURALIUM UNIVERSITATIS JILINENSIS] in Chinese No 1, 28 Feb 85 pp 119-126

TEXT OF ENGLISH ABSTRACT: A semi-computable algorithm of linear realization of a finite automata is given. The algorithm can determine whether a finite automata has a linear realization in a finite field K and gives the linear realization when the automation has a linear realization.

9717
CSO: 4009/177

Industrial Hygiene

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TITLE: Tianjin ZHONGHUA LAODONG WEISHENG ZHIYEBING ZAZHI [CHINESE JOURNAL OF INDUSTRIAL HYGIENE AND OCCUPATIONAL DISEASES] in Chinese No 5, Oct 84 pp 256-259

ABSTRACT: In the early 1960's, 71.4 percent of pesticide intoxication occurred via percutaneous adsorption. Studies of this adsorption made with radioactive labeling of pesticides began in 1963. The experimental models of in vitro skin were constructed in 1980; autogenous skin sections were used to compare percutaneous adsorption in vivo and in vitro. It was found that by studying percutaneous chemical adsorption of in vitro skin it is possible to estimate percutaneous adsorption of the intact organism with the advantages of rapid and sensitive results. The authors' experiments for more than 20 years, on percutaneous adsorption of pesticides with its causal factors and preventive measure, are analyzed in the paper to provide a basis and major preventive guidelines for pesticide intoxication. Cotton makes the best protective clothing. When necessary, thin plastic film can be formed into protective leg and foot covers. Protective gloves can be the surgical type, made of thin plastic film or cotton. Not later than half an hour after pesticide contamination, water and soap should be used in washing. Four tables show osmosis values and rates for four pesticides through human skin with and without protection, and through rabbit skin.

10424
CSO: 4009/201

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TITLE: "Experimental Study of Rapid Detection of Bacillus Anthracis by Microfluorescent Antibody Supravital Staining Technique"

SOURCE: Beijing ZHONGHUA YIXUE JIANYAN ZAZHI [CHINESE JOURNAL OF MEDICAL LABORATORY TECHNOLOGY] in Chinese No 1, 6 Mar 85 pp 23-25

ABSTRACT: This paper reports a new technique of microfluorescent antibody supravital staining used for rapid detection of bacillus anthracis. By this method, results can be gained on various specimens without isolation of the pure culture, but only by the use of 25 microliters for marking of culture medium solution. This method leads to distinctive morphological characteristics. The minimum concentration of all detected pure anthrax spores is 99 per milliliter; there is no alternate dyeing phenomenon for other bacillus sporogenes aerobicus, Grams (test) positive reaction coccus and Grams negative reaction bacillus. This method combines the fluorescent antibody technique and beading test with the advantages of sensitivity, rapidity, uniqueness, micro-quantity, simplicity and economy, suitable to practical application. This is one among the advanced methods for rapid diagnosis of bacillus anthracis.

One table shows the interference results caused by miscellaneous bacteria while the concentration of B. anthracis spores is 99 per milliliter. Two photographs show the shapes of anthracis spores, and staining of fluorescent antibody of B. anthracis beading.

10424
CSO: 4009/222

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TITLE: "Enteroinvasive Escherichia Coli First Isolated From Specimens of Patients With Food Poisoning"

SOURCE: Beijing ZHONGHUA YIXUE JIANYAN ZAZHI [CHINESE JOURNAL OF MEDICAL LABORATORY TECHNOLOGY] in Chinese No 1, 6 Mar 85 pp 7-9

ABSTRACT: This paper reports the first ever (in China) eruptive food poisoning caused by enteroinvasive escherichia coli (EIEC) O_{28ac}; it was isolated, again for the first time ever (in China) from feces of acute diarrhea patients. The food poisoning was caused by tea boiled eggs. The biochemical reaction of EIEC O_{28ac} resembles Shigella. This is an immobile and anaerogenic bacterium, which does not cause (or causes only slow) fermentation in lactosum, and does not cause fermentation in salicin, inositol and alcohol of Adonis davurica, Ledeb. A typical bacillus coli reaction is exhibited in the IMVC test. The titer of the double strength serum antibody of patients increased by a factor of 8 to 64. The pathogenicity of EIEC O_{28ac} was found to be high by experiments on rapid fermentation in dulcite and toxicity with guinea-pig cornea. The bacillus is highly resistant to most other antibiotics. The bacillus had Grams negative reaction. Three tables show the biochemical reactions and serological determination of EIEC, as well as a titer determination of double strength serum antibody of patients.

10424
CSO: 4009/222

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TITLE: "Etiological and Serological Characteristics of Enteroinvasive Escherichia Coli O_{28ac} That Causes Food Poisoning"

SOURCE: Beijing ZHONGHUA YIXUE JIANYAN ZAZHI [CHINESE JOURNAL OF MEDICAL LABORATORY TECHNOLOGY] in Chinese No 1, 6 Mar 85 pp 3-6

ABSTRACT: The paper reports enteroinvasive escherichia coli O_{28ac}, which was discovered in China for the first time. The bacillus was isolated from feces and vomit of patients with eruptive food poisoning, and was proved through toxicity tests on guinea-pig cornea. Corroboration was achieved through biochemical reaction and serological tests. A drug allergic test was also carried out. The titer for blood serum antibody was examined for patients during their acute outbreak period and recuperative period. The bacteria carrier status of patients during the recuperative period was observed. Discovery of enteroinvasive escherichia coli O_{28ac} has the significance of urging further investigation of its biological characteristics, pathogenic regime and epidemiological functions. Four tables show the biological reactions of the subject bacillus, measurement of patients' blood serum antibody, comparison between blood serum antibodies of the same and different patients, and drug allergic values of enteroinvasive escherichia coil O_{28ac}.

The authors thank the following individuals: director Yang Zhengshi [2799 2973 2514] of the biological product examination office for his counsel, and colleagues QU Baohua [1448 1405 5478], DU Yueting [2629 6460 0080], LIU Yaming [0491 0068 2494] and LI Chunfeng [2621 2504 7364] for their participating in the study.

10424
CSO: 4009/222

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TITLE: "Experimental Study on Enzyme-Labeled SPA Staining for Rapid Detection of Bacillus anthracis in Infected Tissues"

SOUREC: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 4, Aug 84 pp 168-170

ABSTRACT: The characteristic of capsule formation in animal body of toxic strains of Bacillus anthracis was utilized for a study on the use of enzyme-labeled SPA staining method to detect Bacillus anthracis in artificially infected animal tissues. Although other bacteria coexist with B. anthracis and some large bacillus, such as Clostridium perfringens, also cause the formation of capsules, under the described culture condition, detection of B. anthracis was not affected. The fluorescent antibody technique and the routing culture method were also used to test identical tissues for comparison a coincidence rate of 96.17 and 94.25 percent respectively was produced. The method was found to be as sensitive, specific, and rapid (producing a result in 2-3 hours) as the fluorescent antibody method, while there is no need for a fluorescent microscope and the specimens are easier to preserve to make this method more suitable for local medical units and a diagnosis may be obtained much sooner than the routine culture method.

6248
CSO: 4009/194

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TITLE: "Rapid Detection of Plasmid DNA"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 5, Oct 5, 84 pp 216-218

ABSTRACT: Following a brief explanation of the importance of detecting the presence of plasmid DNA in microbes for clinical medicine as well as genetic engineering, the paper reports a technique designed by the authors to detect plasmid DNA quickly and to determine its size. With the technique, microbial colonies are picked up from the solid medium directly and cracked before proceeding with agarose gel electrophoresis. It may be used for both gram negative and gram positive bacteria and is simple and fast, requiring no special equipment. The authors cautions against picking up too many microbial cells at once, however, because the microbial chromosome DNA background will influence the detection result. Processes of the experiment to detect plasmids inEscherichia coli and Bacillus subtilis are reported and illustrated with electophoretograms.

6248
CSO: 4009/195

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TITLE: "DNA-DNA Hybridization Technique With DNA Immubilized on A Membrane and its Application in Bacterial Homology Estimation"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 5, Oct 84 pp 225-228

ABSTRACT: Since the adoption of the new index of G + C mol% in molecular genetics and microbial classification, DNA hybridization has begun to be extensively applied in foreign countries. Due to limitation of certain conditions, the technique is just beginning to be developed now in China. This paper reports the authors' effort in establishing a method of H-TdR internal labeling of microbial DNA; through solid membrane molecular hybridization the method is used to identify genetic homology of microbial DNA. The labeling work is simple and the result stable. Details of the experiment are described.

6248
CSO: 4009/195

Microbiology

AUTHOR: ZHU Gejian [6175 5514 0256]

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TITLE: "Method of Preservation of Microorganisms With Phosphate Buffer"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 5, Oct 84 pp 231-234

ABSTRACT: This paper reports the results of an experiment to store 51 species of microorganisms of 24 genera with a phosphate buffer solution. Seed microbes were preserved with the gel plug slant culture method, the gel plug mineral oil method, and the phosphate buffer solution method for 3 years for comparison; survival rates of 93.5, 80, and 96.88 percent were obtained respectively to prove phosphate buffer to be superior. The three methods were also tested and compared for preserving yeast and fungi and the phosphate buffer medium was found to be the best in all cases. Detailed results are reported in tables.

6248
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TITLE: "Research of Aerobic Biological Treatment of Wastewater Containing Cyclotrimethylene-Trinitroamine (RDX)"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 1, Feb 85 pp 14-16

ABSTRACT: In the process of manufacturing the highly toxic explosive RDX, a large quantity of industrial wastewater is discharged, which is generally, in China and abroad, treated with activated charcoal, ozone, ultraviolet light, etc, at a very high cost, because it is commonly believed that heterocyclic compounds such as RDX are difficult to be biodegraded. This paper reports the authors' success in isolating and selecting 6 strains of bacteria capable of aerobic degradation of RDX. In a culture medium of the bacteria, when the density of RDX is 40-70 mg/l, the rate of RDX elimination is above 90 percent in 1-3 days. Of the 6 strains, three, 140, 128, and 22-1, have been identified to belong to Corynebacterium spp.; the other three, 22-2, 402, and 511, are yet to be identified. The process of bacteria culture, and the technique, tools, and procedures of wastewater treatment using these bacteria, as well as the methods of determining the RDX contents of the water are explained in some detail.

6248
CSO: 4009/197

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Title: "Preparation and Application of Phage-Resistant Serum of Bacillus thuringiensis"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 1, Feb 85 pp 6-7

ABSTRACT: The production of Bacillus thuringiensis agent was once seriously threatened by a phage. The paper reports an experiment with the preparation of a phage-resistant serum to counter the damage. The method reported by M.H. Adams was adopted to isolate and purify the phages from cultured Bacillus thuringiensis var. tianmensis 7216 and injected them into rabbits, the blood of which was taken to isolate the antiserum. The antiserum was then diluted with saline solution into various strengths for an optimal density test. The results indicate that in a density of 2.1 x 10 unit/ml the phages are completely neutralized in the antiserum after a duration of 12 minutes. Under the condition of the experiment it takes about 3 weeks to prepare the antiserum. Further study is needed to shorten this time requirement. Perhaps the first dose of phages injected into the rabbits should be higher, just short of killing them, so as to produce a much higher reaction from the rabbits.

6248
CSO: 4009/197

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TITLE: "Isolation and Identification of δ-endotoxin of Bacillus thuringiensis var. israelensis"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 1, Feb 85 pp 3-5

ABSTRACT: The technique of isoelectric focusing gel electrophoresis was adopted successfully to isolate δ-endotoxin from a H14-serum strain of Bacillus thuringiensis var, israelensis, supplied by the Zhongshan University Entomology Research Center of Guangzhou. The presence of δ-endotoxin was identified by gel electrophoretic and immunological methods; its molecular weight was determined to be 23,000 dalton and the pI $\cong$ 5.0. The authors; therefore, believe that δ-endotoxin produced by different strains of that bacillus has structural difference to cause it to have different toxic effects on different types of insects. They suggest that perhaps it is possible to alter the structure of δ-endotoxin to enlarge its scope of toxicity and make it into an insecticide for a greater varieties of insects. Procedures of the experiment are described.

6248
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TITLE: "Studies on Biological Properties and Pathogenicity of L-Bacteria"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 1, Feb 85 pp 32-35

ABSTRACT: This paper reports studies on the mutant L type bacteria with defective cell walls in the aspects of (1) Morphology and culture; (2) Growth, reproduction, and atavism; (3) Biochemical reactions; (4) Antigenicity; (5) Sensitivity to antibiotics. With respect to the oft debated question pathogenicity, following a review of various points of view of scientists of different countries, the paper reports a successful experiment with inducing interstitial plasma cell pneumonia in mice, from the cells of which only L-bacteria were isolated. Due to insufficient understanding of L-bacteria and the laboratory conditions required to culture it, it is very possible that the less than 20 percent rate of incidence in Chinese hospitals is not correct. Of the 414 pyemia specimens cultured by the authors in 5 years, the average positive rate of L-bacteria was 72.5 percent. Most of these are atypical and granular cells but the defective cell wall phenomenon was verified in smears, and atavistic studies proved them to be Staphylococcus aureus, to indicate that in L bacteria studies, granular bacteria should not be ignored either.

6248
CSO: 4009/197

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TITLE: "A Simple Method for the Determination of Microorganisms in Air"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 1, Feb 85 pp 37-38

ABSTRACT: In foreign countries, special instruments are used to test and determine the extent of air pollution. In China, the method of exposing a culture medium plate at the test site for 3-5 minutes is normally used. The result is then compared with that of another site obtained in the same manner. This paper recommends a technique of withdrawing a given quantity of air with an aseptic hypodermic syringe. The air specimen is injected in a premelted solid medium to be cultured under aseptic conditions for 3 days before counting the number of microorganisms. The result may easily be converted to a microorganism content of one liter of air. Several air samples may be taken of the same site to produce an average in order to improve the accuracy of the test. Unlike the current method, this test result is both quantitative and qualitative and there is less of a chance of contamination. The technique may also be used to test fungal contents of air.

6248
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TITLE: "Biosynthesis of Components Constituting Bacterial Cell Walls"

SOURCE: Beijing WEISHENGWUXUE TONGBAO [MICROBIOLOGY] in Chinese No 1, Feb 85 pp 44-46, inside front cover

ABSTRACT: For the purpose of clarifying the relationship between cell wall and cell membrane, and its significance in the action mechanism of some antibiotics, this paper introduces the processes of biosynthesis of major material components of the cell wall, including the stages of biosynthesis of mucopeptides, phosphoric cell wall acids, and lipo polysaccharides. There is a separate paragraph to explain briefly the actions of some antibiotics in inhibiting the biosynthesis of mucopeptides in various different stages.

6248
CSO: 4009/197

Microcomputers

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TITLE: "Information Sharing of dBASE-II With Chinese BASIC"

SOURCE: Beijing WEIJISUANJI YINGYONG [MICROCOMPUTER APPLICATIONS] in Chinese Vol 5 No 3, Aug 84 pp 41-44

ABSTRACT: Since dBASE-II cannot output Chinese characters this limits its use in management and science. The authors have developed a technique for character output by converting information between dBASE-II and Chinese BASIC in a compatible format through an external interface. The COPY command converts dBASE-II files into Chinese BASIC compatible format and the APPEND command converts the files from Chinese BASIC back to dBASE-II. dBASE external files are stored in ASCII code, thus the Chinese BASIC commands INPUT/PRINT are used to query the files. Since the disk drive acts in the same way as the console, it accepts input in the same fashion. Similarly, using the PRINT command will send ASCII encoded data to a disk just as it would send it to a printer or terminal. Since data length sent to an external file after processing must be not greater than the length of the original field, field length is established when the data base is set up. The system was tested using the DUMP command under CDOS and proved to be feasible and the original database was also expanded using the APPEND command. This technique can also be used with extended BASIC.

8226
CSO: 4009/193

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TITLE: "Application of Microcomputers in Calculating Short-Circuit Current in an Electrical Network"

SOURCE: Beijing WEIJISUANJI YINGYONG [MICROCOMPUTER APPLICATIONS] in Chinese Vol 5 No 3, Aug 84 pp 54-57

ABSTRACT: Most power system problems are caused by short circuits. The seriousness of short circuits can be reduced by rational selection of electrical equipment and relay devices. For this, it is necessary to carry out computations to determine system parameters and the junction situation. These computations can be done by hand, but the introduction of computers permits the inclusion of a greater amount of data, the introduction of advanced computation techniques, and greater detail to complex problems. The mathematical model was based on the node voltage equation to find the node voltage, short circuit current and branch current. The computer program is in three parts: 1) input of raw data and formation of node admittance matrix; 2) deriving the inverse of the node admittance matrix and forming the node impedance matrix; 3) computing and printing out of short circuit current, node voltage and branch current. This program reduces raw data to a minimum and uses a specifying format to reduce error. The accuracy of the program was verified by carrying out manual and computer computations of the same set of data with identical results. The program can be limited by the capacity of the computer, but it also has some limitations itself. It has, however, been used to compute the short circuit current of networks of from 3 to 20 nodes. The program will greatly improve speed of computation as well as accuracy and precision. Work that used to take 2 weeks to do by hand can now be done in less than 10 minutes.

8226
CSO: 4009/193

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TITLE: "Anti-interference Measures in Microcomputer Applications"

SOURCE: Beijing WEIJISUANJI YINGYONG [MICROCOMPUTER APPLICATIONS] in Chinese Vol 5 No 3, Aug 84 pp 45-49

ABSTRACT: There are many causes for interference which creates problems with computer interfaces: transmission path, operating environment, power source, etc. It is difficult to avoid interference. The key is in keeping interference out of the computer, but economic feasibility must also be considered. Interference caused by the AC power supply can be prevented by adoption of voltage stabilizers, low pass filters, insuring stable and uninterrupted incoming power, and by equipping tall buildings with lightning rods. Interference introduced through I/O signal transmission lines can be prevented by adoption of current transmission mode, using plastic shielded telephone cable, taking care to avoid interference fields when laying cable, and taking care when installing pulse signal transmission. Interference in I/O interface can be prevented by using a differential operational amplifier to isolate it. In pulse signal circuits, the I/O interface can be isolated by using a photoelectric coupler. Interference caused by internal thermal noise can be suppressed by use of air conditioning or ventilation. Interference can also be caused by grounding a microcomputer when there is a ground current. When sensing or actuating elements are being used, these elements and the microcomputer should not be grounded. In other instances, the microcomputer and all peripheral devices should be grounded. Static charges which build up on personnel and the environment can interfere with normal computer operations. These can be reduced by proper design and construction of the computer room, maintaining proper humidity, reducing static buildup on personnel, preventing high-frequency radiation and induction currents, screening interference sources, combating dust, and selecting components which are resistant to interference. By considering all factors in an environment and taking appropriate measures, it is not difficult to combat the impact of interference on microcomputers.

8226
CSO: 4009/193

Molecular Science

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TITLE: "Polymerization of Butadiene in the Presence of a Strong Field Ligand of d^{4-8} Elements of the Group IV Transition Series"

SOURCE: Wuchang FENZI KEXUE YU HUAXUE YANJIU [JOURNAL OF MOLECULAR SCIENCE] in Chinese Vol 4 No 2, Jun 84 pp 279-280

ABSTRACT: Since the discovery of Ziegler-Natta catalysts, the catalytic function of d-elements has been a frequent subject of investigators. K. Matsuzaki, et al. systematically studied elements of the group IV transition series; he found that Ni and Ti exhibit relatively high activity while Fe and Mn show very low activity. Earlier, the authors reported that p-diolefins are polymerized with the highest ever recorded activity when Fe series catalysts incorporating as third components phenanthrene (Phen) and bipyridine (bPy) are used. Thus, a new motivation was now evident relative to the previous explanation for the activity of d elements; this inspired the authors to study the function of d elements that is due to the third components. The paper analyzes the d^{4-8} elements of the group IV transition series, finding an inverse law in contrast to the conclusions of K. Matsuzaki, et al. The present authors give a unique explanation. The metal elements in the experiments are naphthenates with Phen as the ligand and triisobutyl aluminum as the reducing agent. Two figures show the relationship between the activity of d^{4-8} elements and ligand field stability energy LFSE(Δ) for high and low ligand fields. A table lists LFSE(Δ) values for different d elements.

The paper was received for publication on 1 April 1983.

10424
CSO: 4009/101

Molecular Science

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TITLE: "Polyvinylchloride Interaction With Cosolvents"

SOURCE: Wuchang FENZI KEXUE YU HUAXUE YANJIU [JOURNAL OF MOLECULAR SCIENCE] in Chinese Vol 4 No 4, Dec 84 pp 579-582

ABSTRACT: The viscosity method was used as a study of solvent behavior of polyvinylchloride (PVC) in binary cosolvent systems such as tetrahydrofurfuryl/N, N-dimethylformamide (DMF), cyclohexanone (Ch)/tetrahydropyridine (THP) and DMF/benzene series. The interaction of PVC with cosolvents requires both desirable electron characteristics and spatial structure, thus requiring that the binary cosolvents satisfy both conditions. Selection of a suitable component in a cosolvent for participation by dissolving PVC occurs simultaneously; this viewpoint of intermolecular selection is detailed in a paper by Xu Chengwei and Jin Songshou [6855 2646 1108] in HANGZHOU DAXUE XUEBAO [HANGZHOU UNIVERSITY JOURNAL] (Natural Science Edition), (4), 69 (1979). Figures 1 through 3 show viscosity measurements of THF-DMF-PVC, Ch-THP-PVC and DMF-benzene series-PVC series.

The first draft of the paper was received on 15 October 1983; the final revised draft was received on 26 March 1984.

10424
CSO: 4009/104

Pharmacology

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TITLE: "Pharmacological and Clinical Studies of Anordrin as a Contraceptive Agent"

SOURCE: Beijing YAOXUE TONGBAO [CHINESE PHARMACEUTICAL BULLETIN] in Chinese No 1, 8 Jan 85 pp 49-52

ABSTRACT: Anordrin is a contraceptive agent developed in China and has been certified for clinical use. As analyzed in animal tests and clinical findings, anordrin has functions in a number of major phases in the reproductive physiology process, such as affecting the oosperm motion and growth, as well as secretion and growth of internal uterine membrane. The efficacy of anordrin during an animal's early pregnancy period is significant; after its administration, the serum pregnancy ketone level drops sharply, resulting in early degradation of lutein by dissolution. Then the embryo necroses or is absorbed into the mother's body, terminating the pregnancy. In the clinical study, the effective rate in 6,056 monthly periods is 99.5 percent; this is 94.0 percent in terms of a woman's year. By administering an enterally dissolved 7.5 mg anordrin (red) tablet, the efficacy of pregnancy prevention is high, with minor side effects.

10424
CSO: 4009/167

Radiology

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TITLE: "A Radioprotective Agent--2, 2'[(m-tolyl) imino] Diethyl-sodium Thiosulfate"

SOURCE: Beijing XHONGHUA FANGSHE YIXUE YU FANGHU ZAZHI [CHINESE JOURNAL OF RADIOLOGICAL MEDICINE AND PROTECTION] in Chinese No 6, 25 Dec 84 pp 61-62

ABSTRACT: In seeking highly effective but low-toxicity radiological protective agents, a series of 2, 2'(aromatic imino) diethyl-sodium thiosulfates was synthesized and selected; among the compounds, 2, 2'[(m-tolyl) imino] diethyl-sodium thiosulfate (MTDT) is among the better agents. The paper reports on the radiological protective function of MTDT on mice with and without tumors. The three transplanted tumors in the experiments were sarcoma 180 (S_{180}), Eck's ascites cancer (EAC) and reticulocytic leucemia (L_{615}). The control group consisted of normal mice. Both groups were subject to radiation bombardment with 515 or 850 roentgens; before radiation, the prevention group was injected with MTDT while the control group was given physiological saline solution.

A table shows that the survival rate of the prevention group is much higher than that of the control group (as high as 56.7 versus 13.3 percent, to as low as 30.0 versus 18.0 percent). Another table shows the protective function of MTDT on the hematopoietic system of mice with tumors. A figure shows the effect of MTDT on white blood cells and mononuclear cells in mouse marrow. The paper was received for publication on 3 August 1983.

10424
CSO: 4009/206

JPRS-CST-85-019
18 June 1985

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TITLE: "GaAs Metal-Thin Insulator-Semiconductor Schottky Barrier FET with High-Doped Channel"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 577-584

TEXT OF ENGLISH ABSTRACT: GaAs M-I (10^2 Å)-S Schottky barrier FET (MIS SB FET) with high doped channel is presented for the first time. Using Si implantation into GaAs S.I. substrate, a very thin and high-doped layer with a peak carrier concentration of 0.5-1x10^{18} cm^{-3} and a thickness less than 0.1 μm is formed for the FET channel as well as for the source/drain layer. Between the Al gate and the GaAs active layer, there is an anodized native oxide layer with a thickness less than 10^2 Å. The GaAs MIS SB FET of dual-gate structure with a gate length of 2 μm and a width of 400 μm is fabricated.

The pinch-off voltage of the FETs obtained is about 4 V. The transconductance determined at zero gate bias is 25 mS, higher than that of normally-made MES FETs with similar structures in this laboratory.

Based on the two-region model and the effect of the thin insulating layer, the GaAs MIS SB FETs DC and microwave characteristics are computed and compared with those of normally-made MES FETs.

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ORG: Both of the Institute of Semiconductors, Chinese Academy of Sciences

TITLE: "Calculation of Decay Rate for Polaron and Soliton Pair in Transpolyacetylene"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 585-595

TEXT OF ENGLISH ABSTRACT: Using the multiphonon transition theory as applied to the problem of soliton-pair and polaron generation in polyacetylene by Su and Yu, we have calculated the decay rate of an injected electron into a polaron and an electron-hole pair into a soliton-pair. The main distinguishing feature of our calculation is that the nonorthogonality of the electron wave functions in the N-electron transition is strictly taken into account.

It is shown that the nonradiative decay time of an injected electron into a polaron by lattice relaxation is not less than 4.7×10^{-15} seconds, which is comparable to the numerical results obtained by Schrieffer, et al., and that of an electron-hole pair into a soliton-pair is more than 1×10^{-15} seconds, which is in agreement with the experimental results.

The calculation of the cross section for the soliton-pair photoproduction shows that the transition for neutral soliton-pair photoproduction is forbidden. This is in agreement with the selection rule discussed by Su and Yu.

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TITLE: "AES Analysis of Sapphire-Silicon and Spinel-Silicon Interfaces"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 596-604

TEXT OF ENGLISH ABSTRACT: Sapphire-silicon and spinel-silicon interfaces have been studied using AES associated with Ar^+ sputtering. The origins of the charging effect observed in the measurements of insulating substrates and semiconductor epitaxial layers have been analyzed. The appropriate method of obtaining correct information has been proposed which seems to satisfy AES profiles obtained on this basis.

The effects of epitaxial temperature, growth rate and annealing temperature on the interfacial width have been studied. The experimental results have been discussed according to the features of nucleation and growth during the silicon heteroepitaxial process on insulating substrates. The difference between the interfacial widths of sapphire-silicon and spinel-silicon may be attributed to the crystallography relationships between substrates and epitaxial silicon and their effects on the nucleation densities.

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et al.

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TITLE: "Channeling-Backscattering Studies of Self-Supporting Silicon Monocrystalline Films with Submicron Thickness"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 605-610

TEXT OF ENGLISH ABSTRACT: MeV proton backscattering has been used to measure the thickness, uniformity and surface contamination of two kinds of self-supporting monocrystalline film. The effect of both monocrystalline perfection and surface contamination on the channeling property of the film has been determined by MeV proton channeling.

AUTHOR: WANG Zhengxiao [3076 2973 1321]

ORG: Institute of Semiconductors, Chinese Academy of Sciences

TITLE: "Finite Element 2D Numerical Analysis of Microwave Recessed-Gate GaAs FETs"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 611-620

TEXT OF ENGLISH ABSTRACT: The internal physical pictures of microwave recessed-gate GaAs FETs, such as the distributions of carrier concentration, potential, field and velocity, are revealed by using finite element 2D numerical analysis, and some important parameters as functions of recess depth are calculated. Based on these analyses and calculations, a series of problems of device physics concerning recessed-gate GaAs FETs is discussed, e.g., the status of the dipole layer inside the device, the concept of "effective gate length," reasons why the recessed gate structure is superior to the planar one both in microwave power and in microwave low noise applications.

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ZHANG Shili [1728 0013 3810]
WANG Huanjie [3769 3562 2638]
et al.

ORG: All of Fudan University

TITLE: "Three-Dimensional Computer Simulation of Low Pressure Chemical Vapor Deposition"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 621-630

TEXT OF ENGLISH ABSTRACT: Based on one-dimensional LPCVD computer simulation formulae reported previously, a three-dimensional LPCVD computer simulation formula is reported to calculate within-wafer and wafer-to-wafer uniformity simultaneously. In form, this new simulation formula can be divided into two parts: the solution for the within-wafer uniformity can be obtained by solving a diffusion-transference problem, while the wafer-to-wafer uniformity can be simulated by the one-dimensional LPCVD computer simulation formulae in which only the deposition areas are modified. Success has been achieved in LPCVD equipment and technology research by using this three-dimensional LPCVD computer simulation.

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TITLE: "Electroreflectance Spectra of AlGaP"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 631-637

TEXT OF ENGLISH ABSTRACT: The electroreflectance modulation spectra of $Al_xGa_{1-x}P$ ($x \leq 0.58$) liquid phase epilayers are investigated in the range from 2.0 eV to 5.5 eV. The spectral structures measured are analyzed to obtain the dependence of critical points in energy bands (E_0, E_1, E'_0, E_2) on the composition x, the broadening parameters and relative intensities of relating structures.

Based on the energy bands of GaP and AlP, the change of energy gaps in AlGaP solid solution at critical points with x is discussed according to the virtual crystal approximation.

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TITLE: "The 950nm Emission from InGaAsP/InP Double Heterojunction Laser Diode and Auger Recombination"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 638-645

TEXT OF ENGLISH ABSTRACT: A 950 nm emission band from 1.3 μm InGaAsP/InP DH laser has been observed. The experimental results show that this emission is neither due to remote InP p-n junction nor to the recombination from conduction band to spin orbit-off valence band. Considering the self-absorption in InP in edge emission, the peak wavelength of the 950 nm emission is qualitatively consistent with the peak wavelength of the lateral photoluminescence spectra of InP. The integrated intensity of the 950 nm emission strongly depends on the injected carrier concentration n in active layer ($I \propto n^3$). This experimental result can be well explained when considering the injected carrier overflow from InGaAsP to InP confinement layer by energetic carrier created by Auger recombination in InGaAsP active layer.

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TITLE: "Optical Absorption and Its Annealing Studies in Hydrogenated Amorphous Semiconductors"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 646-652

TEXT OF ENGLISH ABSTRACT: The optical absorption edge spectra of a-GaAs:H have been measured and studied. The samples were deposited on quartz substrates in an Ar and H_2 mixture by rf sputtering. The effect of thermal annealing in vacuum on the optical absorption has been studied. A low energy absorption tail was observed at $h\nu \leq 1.2$ eV and about $T_\alpha \geq 300°C$. It is attributed to the optical transitions between the defect states in the valence band and the defect states in the gap.

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TITLE: "Chemisorption of Cu, Ag, Au on Si and Ge Surfaces"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 653-660

TEXT OF ENGLISH ABSTRACT: The noble atom chemisorptions on elemental semiconductor surfaces Si (111) and Ge (111) are studied using the cluster model and the charge self-consistent extended Hückel method. The results show that all these noble atoms will adsorb on the threefold hollow sites and beneath the surface. The local densities of states calculated are in quite good agreement with experimental data.

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TITLE: "Al_2O_3 Film Grown by CVD and the Interface Characteristics of Al_2O_3-InP and Al_2O_3-Si"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 661-665

TEXT OF ENGLISH ABSTRACT: Al_2O_3 films have been grown on the substrates of Si and InP by the CVD method. The properties of the Al_2O_3 films and the interface characteristics of Al_2O_3-Si and Al_2O_3-InP have been measured by ellipsometry, high frequency C-V, quasistatic C-V and DLTS. The measured results have been analyzed.

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TITLE: "Aluminum Autodoping Profile of SOS Films"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 666-670

TEXT OF ENGLISH ABSTRACT: Aluminum autodoping profile of SOS films overlaid with gold has been shown by the SIMS technique. The results indicate that the profile depends considerably on the technological process. The aluminum profile of SOS film with back surface sealed is very sharp in the neighborhood of the Si/Al_2O_3 boundary, thus having a transition layer thickness of 450-750 Å, while the aluminum profile of SOS film without back sealing surface is not sharp, thus having a larger transition layer thickness of 1200-1800 Å. In addition, the aluminum concentration in the region outside the transition layer is much higher in SOS film without back sealing surface than in that with back surface sealed. These experimental results show that the main source of autodoping comes from the back surface of the substrate.

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TITLE: "Studies of Yb Doped into Single Crystals of Si by Diffusion and of Its Several Physical Properties"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 671-675

TEXT OF ENGLISH ABSTRACT: Rare-earth Yb has been introduced into the silicon single crystal by means of diffusion for 30 minutes at 1050°C. Two hole traps of Ev + 0.38 eV and Ev + 0.49 eV are found in P-type Yb doped silicon, while an electron trap of Ec - 0.33 eV is found in N-type Yb doped silicon. Their electrically activated concentrations are of the order of 10^{13} cm^{-3}.

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TITLE: "Studies of CW CO_2 Laser Annealing in the Ion Implanted Layers of $GaAs_{1-x}P_x$"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 676-678

TEXT OF ENGLISH ABSTRACT: A CW CO_2 laser annealing behavior of nitrogen and zinc implanted $GaAs_{1-x}P_x$ ($x \approx 0.4$) is investigated. After the measurements on the recovery from crystal damage, electrical activation of implanted atoms and photoluminescence emission, it is found that CO_2 laser annealing has an advantage over the thermal annealing. A preliminary discussion is made of the reason that the CO_2 laser annealing property is better than that of thermal annealing.

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TITLE: "1.55 μm Wavelength Buried Heterostructure InGaAsP/InP Lasers"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 679-682

TEXT OF ENGLISH ABSTRACT: 1.55 μm wavelength InGaAsP/InP BH lasers have been developed using two-step LPE. At room temperature the CW threshold current is as low as 55 mA. L-I characteristics still keep good linearity even if approaching a three-fold DC threshold current. The stable single longitudinal mode and fundamental transverse mode operation can also be obtained at a 1.6-fold DC threshold current.

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TITLE: "Energy Band Structures for Compound Semiconductors AlSb, ZnSe and CdTe"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 683-688

TEXT OF ENGLISH ABSTRACT: The tight-binding method is used to calculate the band structures for compound semiconductors AlSb, ZnSe and CdTe and the density states for CdTe. In this calculation, exponentially decaying s-p four states per atom as the basis set together with an empirical pseudo-potential Hamiltonian were used. It was found that the valence and conduction bands were in agreement with Cohen, et al., by adjusting the exponential decay constant for AlSb. A better valence band and a correct band picture were obtained, but there was less energy accuracy for ZnSe and CdTe conduction bands.

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TITLE: "Function of the Splitting of Ground State Level in Arsenic Doped Germanium"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 689-693

TEXT OF ENGLISH ABSTRACT: Based on the experimental results of mobility, it is suggested that the three-fold state donor level of As impurity in Ge and the splitting of the single-state level have an effect on the low temperature characteristics of arsenic doped germanium thermometer that cannot be ignored, for this splitting leads to a vibration in the sensitivity of the arsenic doped germanium thermometer in the normal conduction temperature range of excited free carriers.

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TITLE: "MBE Growth of Selectively Doped GaAs/N-AlGaAs Heterostructure"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 694-697

TEXT OF ENGLISH ABSTRACT: A selectively doped GaAs/N-AlGaAs heterostructure with an electron mobility as high as 223,000 $cm^2/V \cdot s$ and a sheet carrier concentration of 5.7×10^{11} cm^{-2} at 22 K has been grown by molecular beam epitaxy (MBE). SdH oscillation and quantized Hall resistance of two-dimensional electron gas in the heterostructure have been observed under a high magnetic field at low temperatures.

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TITLE: "A Novel Negative Resistance Switching Device--Bidirectional Negative Resistance Transistor (BNRT)"

SOURCE: Beijing BANDAOTI XUEBAO [CHINESE JOURNAL OF SEMICONDUCTORS] in Chinese No 6, Nov 84 pp 698-701

TEXT OF ENGLISH ABSTRACT: A novel structure of negative resistance switching device, the Bidirectional Negative Resistance Transistor (BNRT), has been developed. The BNRT is based on a combined structure of a transverse transistor and two longitudinal transistors. These three transistors with the same polarity are implemented on a single silicon chip. Fundamentally, the BNRT is a three-terminal semiconductor device. One is the control lead (G), and the others are output leads (E_1, E_2). The response rise time measured for the BNRT is 2-5 ns. Very fast pulse circuits, such as monostable, astable and bistable, have been made by using the BNRT. It is expected that the new device may be widely used in high-speed pulse circuits.

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TITLE: "Adopting OEM Modules in MuP-Based Telecommunication Equipment: Transponding Real-time Telecontrol Data"

SOURCE: Nanjing DIANLI XITONG ZIDONGHUA [AUTOMATION OF ELECTRIC POWER SYSTEMS] in Chinese Vol 9 No 1, Jan 85 pp 45-50

ABSTRACT: The rapid growth of China's power network requires a brand new telecontrol system. The use of the stage-by-stage transponding mode for telecontrol data is a rational configuration. The paper discusses the main software (program design of transponding telecontrol data) of transmission equipment. The efficiency of the transponding compilation program is high, capable of compiling random digits in any remote sensing, total power increase and random telecontrol data. The program has been used in MWY-J121 microcomputer telecontrol data transmission. In September 1983, the program began trial runs in the Northwest China Power Network. Five figures show the frame configuration of telecontrol letter transmission, sending pointer and buffer zone, flow chart of sending interruption program, block diagram, and compilation of transponding telecontrol letters.

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